

Maternal vs. Artificial Incubation

By Jay A. Martin

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“Do I let mom incubate the eggs or should I put them in an incubator?” This question comes up often, especially around breeding season. There really isn't a right or wrong answer. What it boils down to is what works best for you. I'll summarize some reasons for both methods of incubating Ball Python eggs and then expound on those thoughts. Keep in mind, however, I'm not promoting one method over the other. Additionally, this is not an exhaustive study of incubation or a “how-to” guide. My only goal is to provide you with “food for thought” so that you can make an informed decision as to which method to use. There are pros and cons to both methods.

With maternal incubation:

- Brooding females instinctively know how to brood their own eggs
- Brooding females exude a natural beauty
- You can save time and money

With artificial incubation:

- Females can get back on a feeding schedule quickly
- The breeder has more control
- Monetary costs and time are increased

Maternal Incubation

Brooding females instinctively know how to brood their own eggs. Nature has equipped the Ball Python with many generations of experience. She already knows what to do, just as her mother did before her and generations of mothers before them. She has a natural, built-in gauge that can measure humidity and temperature. Some speculate that the labial pits of Ball Pythons are used to sense the temperature of the eggs. Further, many theorize that they can generate heat through rapid pulsation (or shivering) of their muscles – thermogenesis.

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Brooding females exude a natural beauty that just cannot be appreciated artificially. We often think of ourselves as top of the food chain, but the fact is, we aren't. We should be humbled by the power and omnipresence of nature. Most importantly, we should be honored to observe its beauty. If you ever get the chance, notice how the mother Ball Python gently cradles her clutch and stands firm to protect her eggs from any perceived danger – including us! She will brood her clutch for as long as it takes to welcome the next generation of Ball Pythons into this world. This is nature at its best.

You can save time and money. As detailed later in this article, artificial incubation requires extra supplies and these supplies can come at a substantial cost. The savings to the maternal incubation breeder can be as low as \$50, but highly likely to be more. More on this later. Most, if not all, brooding females will refuse food. If it takes an average of 60 days for eggs to hatch and an average of one meal (medium rat) every ten days (normal feeding schedule), you would save on six medium rats over the course of the incubation period. Additionally, you can save time, considering you may not have to feed the animal and monitor the feeding session, which includes record keeping. That could become significant if you have several brooding females. Although, once the female begins to feed, she will likely have a voracious appetite and may eat more than her normal one medium rat every ten days. Many breeders however, advocate smaller and fewer meals for females who have just laid eggs. In most cases, however, this off-feed period can result in a considerable savings in both time and money. All there is to do is periodically check the female, change the water and perhaps mist – less time consuming than feeding.

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There are still a few other considerations to maternal incubation. A study published in the Biological Journal of the Linnean Society suggests that there exists a maximum clutch size for pythons (*Clutch size manipulation, hatching success and offspring phenotype in the ball python (Python regius)*). An increase in mortality rates (for overly large clutches) was noted, likely due to the female's inability to provide adequate hydration. This should not be a problem in most cases, however. Rarely do Ball Pythons lay more eggs than the female can adequately cover – which is a cause of inadequate hydration. Females lay 7 eggs on average.

Manually slitting (pip) eggs would prove difficult at best. The female will be very reluctant to let you do anything of the sort. This is only a problem, however, for those who feel it necessary to pip the eggs. Part of the natural beauty is to watch the animal as it struggles to emerge into a brand new world!

Some argue that you would have to turn your whole enclosure into an incubator to maintain adequate temperatures for the eggs to survive. There does seem to be some truth in this statement. Most keepers lower their nighttime temperatures. As a result, the female would have to work harder to maintain needed temperatures for the eggs. This assumes females are thermogenic – can generate heat. If they cannot, then this would be a period of less than optimal temperatures and could prolong the incubation process. In order to maintain optimal temperatures, your enclosure would need to stay heated 24X7 for the entire incubation period or at the very least, a supplemental heat source would need to be supplied to the brooding female.

Can females tell the difference between a fertile and infertile egg? That's a good question. It would be interesting to place an infertile egg with a female to see how she behaves. Would she attempt to fertilize it or would she discard it? In any event, an adhered infertile egg would likely remain with the clutch until all eggs have hatched. This may or may not be a problem.

Artificial Incubation

Likely, the strongest force behind artificial incubation is the need to get the female back on a feeding schedule so that she can be ready to breed again the following season. Females consume a considerable amount of fat reserves during the breeding season. Eggs can take up 1/3 of the female's body weight – for example, a 1500-gram female can quickly drop to 1000 grams after egg laying. Many believe, breeding season after season results in excessive stress and shortens the life of the reptile. Conversely, others feel it does not result in any long-term harm. One would logically think that the breeding process can cause harm, however, currently there just isn't enough data to support either claim.

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Artificial incubation transfers control from the female to the breeder. Notice, that in both cases (maternal and artificial), control still exists. There is some data that concludes that temperatures fluctuate from maternally incubated eggs. These fluctuations may be several degrees. A breeder may feel that he or she can maintain a more stable temperature and at a specific temperature setting. For example, one clutch of eggs may be incubated at 88 degrees while another is incubated at 91 degrees.

Control is not limited to just temperatures. A critical aspect in Ball Python incubation is relative ambient humidity, or how much moisture is in the air. The breeder can control humidity, however, many breeders still have a hard time providing the correct relative ambient humidity. As a result, egg mortality through desiccation can be high – especially for new breeders. Nevertheless, it is still a controlling aspect of Ball Python incubation that makes artificial incubation desirable.

Artificial incubation comes with additional costs in both time and money. In order to properly incubate Ball Python eggs artificially, you will need:

- An incubator
- Temperature control mechanism
- Substrate

Incubators come in many shapes and sizes. I'm not going to go into detail as this could easily be a subject all its own. Suffice it to say, an incubator can cost anywhere from \$40 to easily exceeding \$1000. Incubators need some way to control the amount of heat they provide to the eggs. Most incubators come with some sort of temperature control mechanism. Some are better than others. For example, many breeders use the Hova Bator brand incubator (see below). The Hova Bator uses a "wafer" to control temperatures. While this works most of the time, many breeders do not believe it's reliable enough to use so they purchase an additional temperature control mechanism such as a Helix DBS 1000, for example. This is normally an additional \$100 – although, the incubator and temperature control mechanism are normally one time purchases. There are many substrates to choose from: vermiculite, perlite (no substrate method), sphagnum moss, aspen, etc. Some may argue that both methods of incubation would require some sort of substrate so this really isn't an additional cost. However, eggs have been successfully incubated maternally using only newsprint as a substrate.

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It takes extra time to artificially incubate eggs. First, you need to setup the incubator and ensure temperatures are stable. Then you have to carefully remove the eggs from the female and place them into the incubator. This involves risk of damage to the eggs. Finally, you will have the ongoing process of “airing” the eggs and providing additional moisture, if needed.

Parting Words

Some breeders believe the stress of maternal incubation should be avoided. They argue that during the period of incubation females will not feed and, as a result, further deplete their reserves (energy & fat), as most have not fed throughout the winter. They also argue that the process of trying to regulate egg temperatures – thermogenesis, tightening and loosening their coils, etc. – also takes a toll on the females health. Although, there’s no data to support this claim, it does seem plausible. However, many put the females back on a breeders feeding regime to get the female back up to weight so she can breed the following season. Certainly, the breeding process is stressful in itself. Breeders with these two thoughts – *maternal incubation is too stressful* and *breed the female the following season* – are obviously at odds.

In the end, you have to weigh your goals against your knowledge and your ability to provide what is needed for either method of incubation. As I said earlier, the choice is yours and neither method of incubation is wrong. For the experienced breeder with several clutches, funding and knowledge, artificial incubation may be the way to go. For the less experienced or smaller breeder who may only produce one or two clutches per season, maternal incubation may work best. Whichever method you choose, I wish you all the success in the world in your breeding endeavor!

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