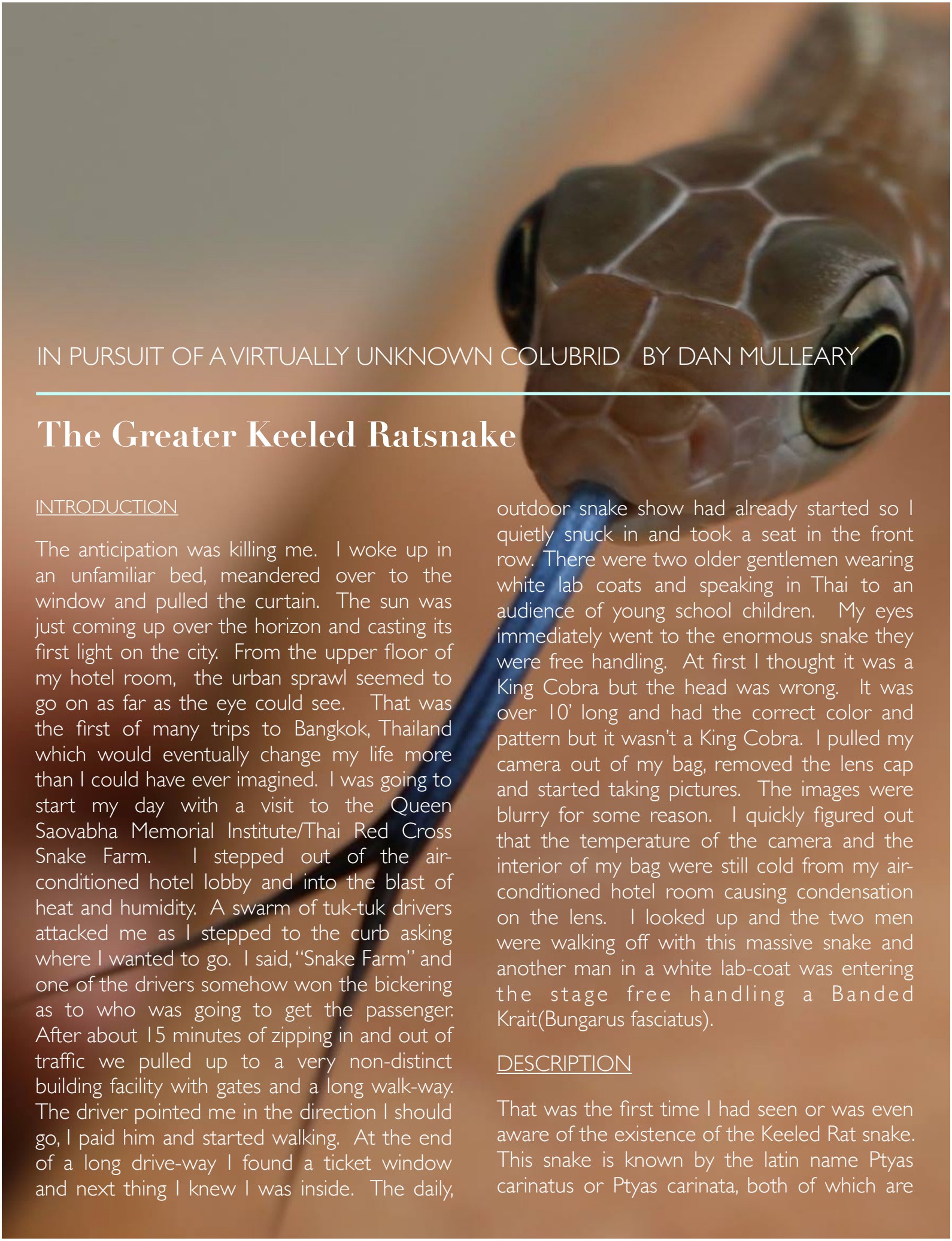

IN PURSUIT OF A VIRTUALLY UNKNOWN COLUBRID BY DAN MULLEARY

The Greater Keeled Ratsnake

INTRODUCTION

The anticipation was killing me. I woke up in an unfamiliar bed, meandered over to the window and pulled the curtain. The sun was just coming up over the horizon and casting its first light on the city. From the upper floor of my hotel room, the urban sprawl seemed to go on as far as the eye could see. That was the first of many trips to Bangkok, Thailand which would eventually change my life more than I could have ever imagined. I was going to start my day with a visit to the Queen Saovabha Memorial Institute/Thai Red Cross Snake Farm. I stepped out of the air-conditioned hotel lobby and into the blast of heat and humidity. A swarm of tuk-tuk drivers attacked me as I stepped to the curb asking where I wanted to go. I said, "Snake Farm" and one of the drivers somehow won the bickering as to who was going to get the passenger. After about 15 minutes of zipping in and out of traffic we pulled up to a very non-distinct building facility with gates and a long walk-way. The driver pointed me in the direction I should go, I paid him and started walking. At the end of a long drive-way I found a ticket window and next thing I knew I was inside. The daily, outdoor snake show had already started so I quietly snuck in and took a seat in the front row. There were two older gentlemen wearing white lab coats and speaking in Thai to an audience of young school children. My eyes immediately went to the enormous snake they were free handling. At first I thought it was a King Cobra but the head was wrong. It was over 10' long and had the correct color and pattern but it wasn't a King Cobra. I pulled my camera out of my bag, removed the lens cap and started taking pictures. The images were blurry for some reason. I quickly figured out that the temperature of the camera and the interior of my bag were still cold from my air-conditioned hotel room causing condensation on the lens. I looked up and the two men were walking off with this massive snake and another man in a white lab-coat was entering the stage free handling a Banded Krait(Bungarus fasciatus).

DESCRIPTION

That was the first time I had seen or was even aware of the existence of the Keeled Rat snake. This snake is known by the latin name Ptyas carinatus or Ptyas carinata, both of which are

correct. The common names, like just about all of them, are too general and this animal is often confused with the smaller Ptyas mucosus or mucosa(also of which both latin names are correct). Ptyas mucosus is generally of a shorter, stouter build and can be described as having the color in a range of earth tones from lighter brown to very dark with most having a lighter colored banded pattern. The forward portion near the head is usually void of pattern but they become more apparent mid-body and more so downwards to the tail. To remedy the confusion often made by hobbyists between P. carinata and Elaphe carinata, I opt to use P. carinatus. I also refer to P. carinatus as the Greater Keeled Rat Snake and the smaller P. mucosus as the Lesser Keeled Rat Snake. Because of the obscurity of both of these species in captivity, this seems to alleviate most of the confusion for those that choose common names over latin.

Hatchling (wild) from Ratchaburi, Thailand

Hatchling imported from Malaysia

Adult of a more common appearance

A nice bi-color with yellow tail.

Ptyas carinatus can be quite variable and come in several color phases but most follow a similar pattern scheme. While at rest, these snakes can appear patternless in the forward half of the body but the rear portion of the body will almost alway exhibit a striped pattern consisting of five parallel lines. Some individuals will exhibit a banded pattern from head to mid-body, where it then transitions to striping. Others will only show the ringed pattern when in an excited state which is usually the pattern on the actual skin rather than the scales. The colors can range from very dark gray to brown and some animals can be bi-colored where the forward half of the body is tan and the rear half is gold. I am unaware of any albinos in existence but there have been a small number of melanistic individuals. The smallest hatchlings I have seen have exhibited a light to dark green color which I believe disappears over the course of the first few sheds.

There is another species, Ptyas fusca or White-bellied Rat snake which is also not a small snake by any means but has a thinner build and no pattern to speak of. However, it is nearly non-existent in the hobby but definitely worthy of an honorable mention. There is a much smaller species Ptyas korros but in Indonesia P. carinatus is called "King Korros" so that even adds more confusion to the various common names being tossed around. While there are other species in the genus Ptyas, for the purpose of this article, I will leave those for another day. That being said, the Greater Keeled Rat snake truly is a king among colubrids and is arguably the largest colubrid in the world. It commonly reaches lengths of 10'-12' and occasionally can exceed that length.

Ptyas fusca, long-term captive female

Large male P. carinatus, also long-term captive

Greater Keeled rat snakes are presumed to occur all throughout Southeast Asia but my personal observations are of those originating from Thailand, Malaysia and Indonesia,(with the largest sample coming from Indonesia). The larger sample should always exhibit the most variability but there is a unique and clear difference in the color of those I have seen from Malaysia. Like the others, these animals retain the typical pattern but they are much lighter with a bone or off-white color in the adults and exhibit nice contrast.

Full grown adult mid-body

Malaysian locality, raised from hatchling(light color)

Studies done on Ptyas carinatus have shown that they do possess a toxin in their saliva, however, they are not rear-fanged. Many of the mildly venomous snakes actually possess enlarged, rear fangs to assist in delivery of toxins with the act of chewing but there is no special dentition that would contribute to this for P. carinatus. In my early days of keeping this species there was some misinformation on this topic and I once thought them to be rear-fanged. Upon my first loss, the first thing I did was take a look inside the mouth and I found no signs of enlarged fangs. Their jaw strength is significant and their slashing bites often cause rips or cuts, as opposed to punctures by boas and pythons, but I have not witnessed any chewing bites in a defensive nature. These animals are large and many keepers resort to "tailing" them but that just sets them off and causes excess stress. Just about all of my personal collection is tolerant of handling(not tailing), and I have learned that keeping one hand about 1/4-1/3rd down from the head seems to give a handler better control and the snakes are more reluctant to come around to lunge strike. I am not really compelled to constantly handle my animals but for those that find this a necessary part of reptile keeping, I did want to touch on the human interaction aspect of these creatures.

Ptyas fusca caught in Khao Sok National Park, Thailand

GOALS

That initial trip to Thailand was in 2003 and it was the first of many to the region. In 2008 the Snake Farm at the Queen Saovabha Memorial Institute underwent a major remodel and is now one of the nicest examples of an educational snake park anywhere in the world. I do go back to visit periodically and they do usually have a Ptyas carinatus on display. They still put on a snake show that is educational which is quite refreshing. While there are many "snake shows" throughout the country, these are merely for the pure exploitation of tourist entertainment and really aren't worth visiting in my opinion.

One of the first things I did upon my return home was to start reaching out to the well-known importers in Florida that I had been buying various colubrids and pythons from. Most had no idea what I was talking about and those that claimed they did just made empty promises probably more so to avoid admitting that they had no idea what I was talking about. Needless to say, I never was able to acquire any Greater Keeled Rat Snakes.

After many trips to Southeast Asia I finally decided that if I was going to make this happen I would need to do it myself. I started importing in 2008. I did get some Ptyas mucosus early on but still couldn't acquire Ptyas carinatus. I could find live Ptyas carinatus in Malaysia at skinner's warehouses but those snakes were too far neglected to even remotely hope for survival…they are commonly skinned and passed off as King Cobra due to the similarity in scalation, color and pattern. It wasn't until late 2011 that I found an extremely capable exporter in Indonesia that delivered in early 2012. I finally received three massive, extremely aggressive males of which one did not establish and died. I knew right away this was going to be one of the biggest challenges I have ever undertaken for both establishing in captivity and captive breeding and it seemed that this venture may also be male heavy.

My supplier was curious after he shipped these specimens to me so he looked into it and advised me that no Ptyas carinatus had been exported out of Indonesia in the previous five years(that was as far back as the search went). The Indonesian national export quota in 2012 was 450 specimens. In 2014 it was reduced to 207 specimens and in 2015 reduced again to 63. In 2016 the annual export quota was 27 and remains the same for 2017. Personally I think 27 is a more realistic number (as 450 doesn't even seem possible) but the reduction from that to double digits is good for the species.

No reptile exporter is going to only send shipments with 2-3 snakes in them so I had to take some very large orders to get just a handful of specimens. Due to them being a large captive, the exporter also did not want to hold them for me so every time 2-3 were acquired I scrambled to find buyers for the other stock to put together a large order and secure my "King Korros". There were more Tokay Geckos, Dumpy frogs and Asian Vine snakes coming through than I ever thought I would see. Finally, after four years of staying the course, I had acquired and established a group of ten with a couple of females in the mix. I did lose some snakes along the way but this was very few and experience was starting to prove invaluable while my luck was getting better as time went on. It was at this time I was seeing the variability within the species. A couple of years later, I also saw a melanistic specimen in Jakarta at a reptile expo which I was unable to acquire at that time. However, this all changed later on.

Melanistic found at the Indonesia International Reptile Symposium, Jakarta in 2013

ACCLIMATION AND HUSBANDRY

Upon arrival, I would remove the large snakes from their snake bags and would manually secure their head and give them a quick "once over". It was at this time I would remove ticks(if there were any) and quickly note any scars or injuries that might need attention. I wanted to keep stress to a minimum with these high-energy snakes because I had learned that too much interaction in the early stages was detrimental to their health. I house them all solitarily with a hide box, large water bowl and some cage décor to provide more security. In the beginning I would leave the snakes almost completely alone except for a quick glance every couple of days. After the first week of no interaction I would start feeding trials. Leaving animals alone was and still is one of the most challenging things to deal with for field-collected specimens. With the advent of social media the urge to post pictures for the world to see is strong but tailing a fresh field collected snake for a photo just wasn't worth it to me…after all I was pioneering something special. Even after long-term animals have calmed down and were accepting of human interaction, I still refrain from handling as the goal of breeding is still incomplete.

With all newly arrived P. carinatus, I would first try live 10-14 day old rats for first meals. This was a non-threatening food item that would provide the stimulus of movement and also not risk any damage to the snake if it did not consume it right away. This was rarely successful but it was worth a try because it did sometimes work. For those that refused I would then try an adult mouse for the change of scent but this would only be attempted for a very short time before removed, this rarely worked. The next step would be to try thawed chicks and quail. I have noticed that of those animals that did take birds, there was no preference between the two. If none of is was successful I will try thawed frog legs obtained from the local Asian food market. Even though these were skinned and nicely cleaned for human consumption, just getting the snakes to eat was good enough for me. My experience has proven that the frozen/thawed frog legs were the most readily consumed. I would also use the water in the package of frog legs for scenting rat pups which did work about half of the time. I also used raw egg to dip rat pups in which also was successful sometimes. There are always some hold-outs for which none of this works. For those I offer Duttaphrynus melanostictus, the naturally occurring toad in the range they come from. These were almost always readily eaten. Some of the truly stubborn individuals were also partial to snakes. This became my outlet for ridding myself of imperfect or still-born hatchling ball pythons or other snakes that were hatched or born within my collection…they were eaten without hesitation. Seeing the voracity for which other snakes were consumed gave me some concern for future pairing and breeding. Once established and feeding, my long-term captives will eat anything off the end of hemostats. At this point I offer chicken hearts, gizzards, eggs and really just about anything you could think of that they would be able to find in the wild. I feed them twice per week with as varied a diet as I can possibly provide. My many trips to their native areas has taught me that as the seasons change, so do different food sources. For example, in the rainy season it might be exclusively frogs and as the rice fields dry out rats and birds may be more abundant. Since I use food cycling as my main method to induce reproduction in the snakes that I work with, I am experimenting to see if certain food items trigger a favorable response in breeding.. This is still a work in progress…

THE LEARNING CURVE

This snake species proved to be the most intelligent snake I had ever worked with. For those that made the claims that their snakes were the smartest, the chances were slim that they ever worked with Pytas carinatus. By age 46, I had worked with many of the snakes kept in the hobby as I was nearing 40 years of experience. As the captives started to adapt to their cage environment, their view outside of the glass cage doors were also being studied and they seemed to grow curious and brazen. I would walk through my work area and the long-term animals would stare at me intently, watching what I was doing and even looking at what I held in my hands. If I walked by with a snake in my hand from another enclosure, some would follow the snake's head hoping to grab it through the glass. A couple of times early on I learned that when I presented food items with forceps, I needed to keep the enclosure doors nearly closed. They always grab the food and move backwards all through the cage dragging it around as if to not simply dispatch their prey but also disorient it. If the cage door is open a little bit they would quickly be on the floor, carrying their prey to another part of the room to eat it(I always got them back in the cage while their mouth was busy eating). Even with food in their mouth I would notice them raising up to get a look at what I was doing. I also noticed that over time they seemed to drop their defensive behavior even without regular handling. They just seemed to learn that I posed no threat and realized I was simply the guy that would give them food, change their water bowls, clean cages and occasionally pull them out for short, gentle handling sessions. They have gigantic eyes with incredible eyesight, it is this that makes them inquisitive and adds another element to keeping snakes. They proved to be one of the most unique snakes I had ever worked with.

These snakes were very difficult to determine gender and I was learning as I went. I figured out that any of the large specimens upwards of 8'-9' were always male. Realizing that I was merely working with a small sampling of field collected specimens, I would still probe to be sure. My theory could always be incorrect and just like everything else in nature, there were always instances which didn't follow the rule. Probing also proved to be somewhat inaccurate at times, especially with the small to medium sized specimens. A second way that I had learned from working with other snake species would be to simply introduce a questionable animal with a big, confirmed male and see if I could judge by the reaction of the two individuals. The anticipated, twitching behavior of a male was also exhibited by females so it was quite confusing. I still found my instinct to be my most reliable method while taking into consideration tail taper, head shape and demeanor.

BREEDING

In early 2015 I had one specimen that had not been probed but my intuition was telling me it was a female. I had gotten this new arrival feeding very well and pushed a lot of food trying to get it into breeding condition. When I felt she was ready I started putting her in with various males under supervision and observing everything as I went. I would see interest by every male with the classic colubrid twitching but this suspected female would also react the same. Finally we probed this animal and we deemed it to actually be a male. I felt defeated, and in hindsight, I thought to myself how pointless it was to be putting two males together. At that time I focused on another animal that probed female and I was also feeding her well to prepare her for breeding condition. In April of 2015 I noticed that the original suspected female animal that was paired numerous times and probed male looked a little thicker than normal. I pulled that snake out that evening and palpated…to my surprise I felt ten distinguishable lumps. The excitement and anticipation that evening made it very hard to sleep that night.

As we looked further into the issues with probing to determine sex, we figured out what the issues were. When probing most snakes, gender is determined by the depth of insertion and distance traveled by counting sub-caudal scales. On average, most male snakes will penetrate between 9-15 subcaudals and females usually 3-8 subcaudals. Our females were probing at 9-10 subcaudals and males 15-20+. Using this data we went back through and probed our colony to find out that a number of the medium sized individuals were actually female. With a trained eye and now being familiar with Ptyas carinatus, other physical traits could be combined to further assist in gender determination such as head shape, overall size, tail taper, etc.

Unfortunately, the breeding season in 2015 was fruitless. Infertile eggs were laid by the female approximately 20 days post shed. I attributed this failed attempt to the gender confusion mentioned earlier and the cessation of pairing her with males for fertilization. However, the season did result in a very important learning experience with gender determination and some data to be applied for the following season.

In 2016 I had undergone a similar protocol and had three females ready for breeding. This time the males were not shy at all and bred within seconds of introduction of a female allowing me to get great photos and video. I would keep them together for 2-3 days and separate for feeding twice per week. The males would be maintenance fed at the same interval but smaller meals for the boys while the females would get larger meals. All three females developed follicles with noticeable lumping in the 7-12 egg count range. However, they would either reabsorb or later expel infertile eggs.

Actual copulation at DM Exotics

Eggs laid by gravid import on the supplier's farm but failed to hatch

IN CLOSING

In the history of reptile keeping, there are only a handful of us that have really gone all out to acquire new species for the hobby. The era that this was even possible is far beyond its prime as there are few reptile species remaining that even present the opportunity to struggle for and pioneer. Sometimes I wonder what I could have accomplished if I was born 10-15 years earlier, but at least in the case of Ptyas carinatus, I have so far accomplished what I set out to do. As of this writing, I am preparing animals for the 2017 breeding season. I am tweaking the feeding regimen, food sources, supplementation, etc. and hoping for success in unlocking the last kept secret of Ptyas carinatus…..breeding.

The author's wife, Apple Mulleary, at the DM Exotics booth NARBC 2015