



Villagers at the high-elevation sites where Boelen's Pythons (*Morelia boeleni*) are found still use traditional methods to hunt.

Serpent in the Clouds: Research and Conservation Efforts for the Boelen's Python (*Morelia boeleni*)

Ari R. Flagle and Erik Stoops

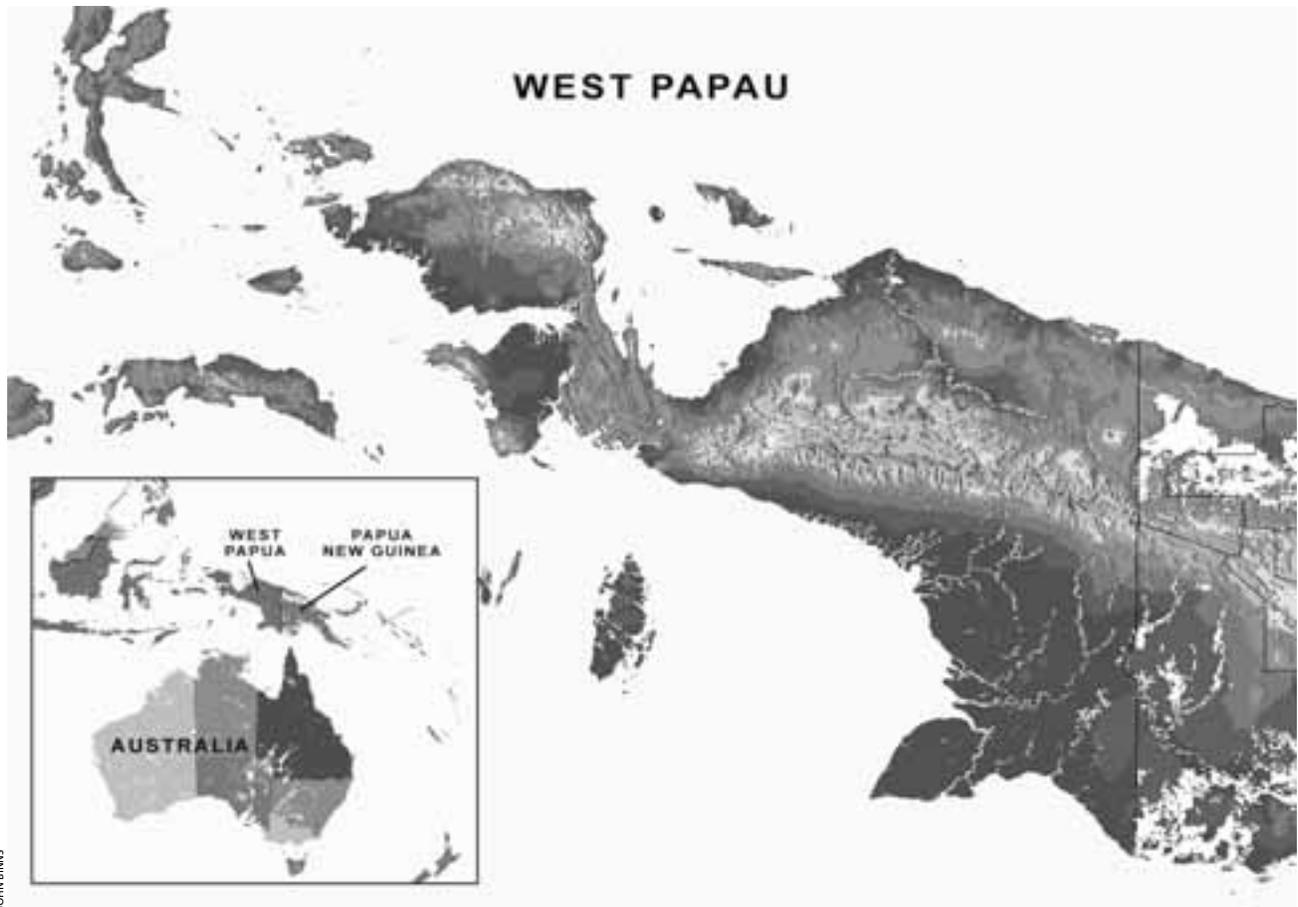
Center for Reptile and Amphibian Research
Phoenix, Arizona

Photographs by Al Baldogo and Ari R. Flagle.



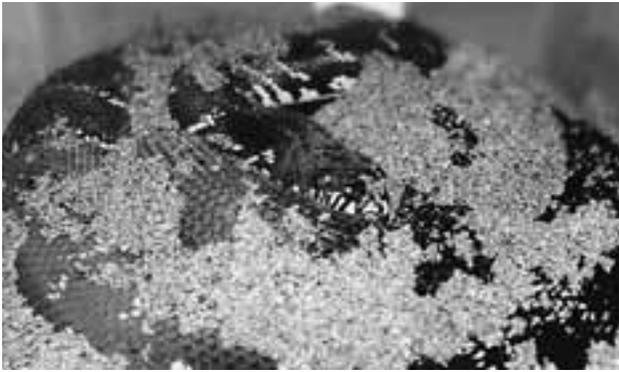
Soaring mountains expand from the far east of Papua New Guinea (PNG) to West Papua Indonesia (Irian Jaya). This tropical island remains one of only a handful of the world's preserved environments and undisturbed regions. Here, nestled deep in the mountains of Papua Indonesia, hidden by the slow-moving mist of the clouds, dwells a creature discovered only fifty years ago and still living unchanged and unmolested by the outside world.

The habitat of Boelen's Python (*Morelia boeleni*) is virtually unknown. Access to the area is difficult and extremely dangerous due to the inhospitable topography, and locals are averse to guiding outsiders into remote areas. Local inhabitants report tales of cannibalism, and, in the past ten years, several newspaper accounts seem to provide evidence that such practices still occur. So, traveling to the highlands of Papua Indonesia to search for *Morelia boeleni* is not an adventure one chooses lightly,



JOHN BINNIS

Due to the rugged topography, the highlands of West Papua Indonesia (Irian Jaya) are among the most remote and unexplored regions in the world.



The unique natural habitat of *Morelia boeleni* creates several obstacles when attempting to duplicate the environment in captivity.

but after eight years of hands-on experience with this species, I (Ari) was determined to take the risk.

In 1997, we developed the Center for Reptile and Amphibian Research (CFRAR), which specializes in caring for a diverse selection of exotic and difficult-to-maintain species. Captivated as we were by the beauty and mystery of *Morelia boeleni*, it was at the top of our list. We began working with this snake during the winter of 1998. In 2004, we wrote the first comprehensive book (*Black Python*) dealing with the husbandry of the species. During the winter of 2006, Eric proposed an idea for a television series called “Reptile Chronicles,” which would incorporate an animated reptilian host. As the subject for the first segment, we selected the Boelen’s Python and shortly thereafter left for the uncharted mountains of Papua Indonesia.

From Ari’s travel journal:

There are many names for M. boeleni throughout Indonesia; Wallow, Hitam Wallow, or Boelen. In Java, the indigenous people call them “Sanca bulan.”

June 2: Feels like I have been here for months. Seven planes and three days traveling. Armed soldiers all over. My bags were emptied of medication, food, tools, batteries, and other small items that momentarily appealed to the baggage handlers. The effort required to simply make the trip is strenuous work for both the body and the mind. I finally understand why most people do not come here: it is just too difficult. The journey by truck is indescribable and I find myself mesmerized by the culture and the physical environment. Never having been in this part of the world, I am experiencing a sense of overwhelming sadness for the people. The economy is such that they have to work for little or nothing in order to survive. We really take for granted what we have. I am feeling morose; I look into the distance and see the mountains above and the clouds rolling over the jagged faces of a virtually untouched environment that is calling to me. No matter how tired I am. I cannot stop. This is why I am here.

June 3: The squatters (toilets) have buckets of dirty water and ladles. You flush by pouring a ladleful of water into the hole. It’s taking me a little bit to get used to, but at least it’s a toilet. The sewer system is essentially a continuous ditch, five feet deep, that parallels the walking paths. It is filled with all the refuse and fecal matter in the village. It was shocking to witness a local man miss the path and swerve his bicycle into the squalid ditch. My instinct was to jump in after him, but my guide grabbed my arm and wouldn’t allow it.



Ari was quite a celebrity. Villagers hunted, slaughtered, and pit-roasted a wild pig in his honor.



Villagers were proud of their prowess with traditional weapons.

June 4: *We arrived in Irian or, as it is now called, West Papua, Indonesia. As soon as we landed, our little plane was swarmed by locals: people wanting handouts, selling trinkets, and trying to help us carry our bags for money. I let a man carry my gear and he asked me, "nama saya?" This means, "Is your name Mickey Mouse?" I laughed and told him my name was Donald Duck and that I was grateful for his help. Many people trying to be western-like — kind of sad. The culture is so rich — why change it? After an uncomfortable night's sleep, we were met by the truck that would transport us to the mountains.*

June 5: *The mountains are amazing! We arrived at our base village. The villagers hunted, slaughtered, and pit-roasted a wild pig in our honor. I don't eat pork but felt compelled to show my appreciation for their hospitality. Then we geared up and set off into the mountains — bad idea! This hike was like nothing I have ever done in my life. We climbed a 70% grade of slippery rock and vegetation. The path used by the indigenous people is very narrow. Then, to top it off, I added 40–50 lb. with my backpack. I stepped off the path and my foot fell through the ferns. Almost lost that one! As I anticipated, the temperature range is from 90 °F in the lowland areas to 75–85 °F in the high country. Breathing is difficult due to the thin air. There is also some talk about another tribe that continues to practice cannibalism.*

June 6: *After the rigorous climb, we arrived at the next village in late afternoon. Set up my tent at the edge of the village, then passed out. I awoke shivering from the unexpected cold. Came out of my tent, looked up, and was in awe. The mountains were dense with*

vegetation and thick clouds were slowly moving over them. It was truly breathtaking. We took temperature readings. They read 44 °F

June 7–8: *Scouting the mountains is extraordinarily exhausting. There is not much visible reptilian life. I found a huge spider web that spanned at least 12 x 12 ft., fishing-line thick.*

June 9: *One of the villagers handed us a bag. "Wallow, Wallow," he said. I looked in and sure enough... It was not just the snake, it was the man and the expression on all our faces. I felt an overwhelming shared connection with these people, their culture, their mountains, their wildlife, and fauna. My research and work at the center had not prepared me for this experience. Yet, theoretically, the writings of Worrell and Brongersma provided me with a solid reference in schematics for identification of the Boelen's.*

This snake (male) was first observed in Dimija on 25 December 1952 by a man named Dr. K.W.J. Boelen. On March 1955, the second and third animals (females) were collected in Okito by R. Den Haan. The fourth animal was collected by R. Den Haan a substantial distance away at Wissel Lakes. The last animal observed and collected was by a man named Dr. C.J. Royer on 19 February 1963 west of Lake Paniai. Prior to this discovery, L.D. Brongersma (1953) described a new species of *Serpentes, Boidae* (pythons were at that time considered to be in the same family as boids). A portion of the description reads, "Rostral as wide as high, visible from above, with a deep groove on each lat-



The mountains were dense with vegetation.



In his original description of the species in 1953, L.D. Brongersma noted “possible differences in color of the chin and throat of the animals collected. This might be related to the sex of the animals captured, males possessing more black marking under the dorsum of the chin and females showing more yellow. They have been noted in the wild to reach lengths of 14 feet and the girth of a grown man’s leg.”



Brongersma noted a “head uniformly black above. Rostral black with the outer borders of the labials yellow. The yellow stripes do not reach past the under shield of the eye or nostril. The body is adorned with jet black and yellow stripes covering the lateral side and dorsum of the snake.”

eral side. Internasals 1.2 times as long as wide. Anterior pre-frontal only very slightly longer than broad (length 12.2 mm, width 12.0 mm), 1.3 times as long as the internasals... A head uniformly black above. Rostral black with the outer borders of the labials yellow. The yellow stripes do not reach past the under shield of the eye or nostril. The body is adorned with jet black and yellow stripes covering the lateral side and dorsum of the snake.”

Information from this original description confirmed that it was indeed the same species of snake, but classified by a different name. A specimen reported to have been collected from the Lae territory of New Guinea was described by Eric Worrell in 1958. The animal, named *Liasis toronga* was by description a specimen of *Liasis boeleni* (the species since has been reassigned to the genus *Morelia*). It was collected from within a chain of mountains in the center of New Guinea. Both individuals described the same scalation and coloration. L.D. Brongersma noted “possible differences in color of the chin and throat of the animals collected. This might be related to the sex of the animals captured, males possessing more black marking under the dorsum of the chin and females showing more yellow. They have been noted in the wild to reach lengths of 14 feet and the girth of a grown man’s leg.”

In the early 1980s, when these pythons first appeared in the United States, they originated from eastern Indonesia (PNG) and differed in length and girth from animals imported more recently. Stripes were white, and the animals were heavier and more muscular. Today’s captive-hatched and farm-bred animals in Indonesia are primarily adorned with yellow bands. They are slim and fast.

The areas where the nest sites are located were extremely dangerous and difficult to reach. The exterior nest areas were covered with shed and scat. Steep slippery rocks and immense amounts of vegetation were everywhere. All climbers had to step carefully on a narrow path or risk falling 100 feet or more through underlying ferns. In order to survive, an animal must be able to navigate the deep, narrow rock crevices to reach shel-



Boelen’s Pythons live at high elevations in the remote mountains of West Papua Indonesia (Irian Jaya). Although lowland temperatures are around 90 °F, high country temperatures are 10–15 °F lower by day and drop into the 40s at night. Breathing is difficult due to the thin air. Locals mention another tribe that continues to practice cannibalism.

ter. In a captive setting, we know that these snakes are highly agitated even after acclimation to new environments. We have noticed that they are uncomfortable with large amounts of space, but are equally anxious with too little room. After experimenting, we found that an enclosure 6 x 3 x 3 ft. was most acceptable. In captivity, snakes appear to prefer isolation except during the breeding season from August to December.

The area inhabited by Boelen's Pythons is high in elevation; the clouds roll in during early morning and dissipate in late



Clouds roll over the jagged faces of a virtually untouched environment.

afternoon. In our center, we create conditions in which we incorporate low light with relatively high UV output. In the mountain areas, basking sessions occur throughout the day when the cloud cover breaks, allowing rocks to absorb heat. We maintain basking lights for up to two hours at 90 °F, at which time the automatic system shuts off, enabling the enclosures to cool slightly (80–85 °F). We repeat the cycle at midday. Shortly after the last basking session, a simulated mist provides a light rainfall that generates the humidity calculated to reach between 40–60%. Care must be taken when utilizing misting units to avoid excessive moisture. The enclosure must include at least one dry area.

Considerable speculation has surrounded the issue of what these snakes feed on in the wild; presumably their diet consists of small birds, bats, and small mammals. While inland, we did not see any ground-dwelling birds; however, our presence might have been enough to scare them away. We did notice an abundance of burrows. Most of these burrows appeared to belong to bandicoots, small rabbit-like marsupials. In captivity, Boelen's Pythons are fed primarily rodents. Small, thawed chicks may induce stubborn snakes to feed.

Several individuals active in the reptile trade in Indonesia regularly produce Boelen's Pythons. Why do the captive snakes in Indonesia reproduce, but snakes imported from the same country do not? One important consideration has to do with natural factors that we can not replicate. Among these are elevation, climate, ultraviolet lighting, temperature, humidity,



The areas where snakes occur are extremely dangerous and difficult to reach. Steep slippery rocks and immense amounts of vegetation were everywhere. We climbed a 70% grade of slippery rock and vegetation.

moisture, soil, vegetation, and other wildlife. The uniquely remote habitat of *M. boeleni* creates several obstacles when



Burrows were abundant and most appeared to belong to bandicoots, small rabbit-like marsupials. In captivity, Boelen's Pythons are fed primarily rodents. Their natural prey is unknown.

attempting to duplicate the natural environment. Research with captive-hatched offspring is necessary, because these animals are more likely to adapt to an artificial environment.

Breeding this snake is not difficult, but the process of actually producing eggs in captivity is quite challenging. To our knowledge, only two successful captive breeding records are known — and these were never recreated. Animals that are imported into the country are usually dehydrated, infested with worms, and have suffered considerable stress from capture and transport. Most animals perish within several months, and those that survive have a relatively short life in captivity. When two sexually mature animals (typically 2–3 years of age for females and less for males) copulate, they subsequently display all of the distinctive signs of becoming gravid. Females will generally increase



To date, captive breeding of Boelen's Pythons outside their native range has failed for reasons yet unknown, although captive-hatched or captive-bred animals from Indonesia regularly enter the wild animal trade.



In captivity, these snakes remain highly agitated even after acclimation to new environments.



Captive-hatched and farm-bred animals in Indonesia are primarily adorned with yellow bands. They are slim and fast.



The striking black and yellow pattern of Boelen's Pythons helps to break up their outline, making them more difficult to see for both predators and prey.



The Indonesian government pays close attention to the high prices that Boelen's Pythons fetch in private and black-market sectors, and a yearly limit on sales is carefully controlled. Proof of a legitimate sale and appropriate paperwork are required before any of these rare snakes are permitted out of the country.

the period of basking and gradually refuse to feed. Females also gain in size and girth and display classic pre-lay shedding behavior. Unfortunately, in captivity, after shedding takes place, the animals fail to deposit any eggs. Why these animals fail to reproduce in a captive setting is unknown. Of several hypotheses we have considered, one suggests that the compatibility of the pair is dependent on location. In the wild, biological markers such as shed skin hanging from nearby bushes and trees and feces around the nest site may allow snakes instinctively to recognize potential mates. We also think that a specific set of pre-breeding behaviors is necessary to stimulate proper egg development.

For the past seven years, the CFRAR has operated a privately funded research project the primary goal of which is to shed light on the unique behavior and captive propagation of Boelen's Pythons. "Project Black Python" emphasizes conservation efforts for both captive and wild Boelen's Pythons. We prohibit the use of imported wild-caught adults as research subjects; only captive-hatched or captive-bred animals from Indonesia are allowed to be shipped. The Indonesian government pays close attention to the high prices these animals fetch in private and black-market sectors, and a yearly limit on sales is carefully controlled. Proof of a legitimate sale and appropriate paperwork are required before any of these rare snakes are permitted out of the country.

We often wonder about the fate of these remarkable creatures as more and more land is lost to deforestation. Is the only means of successful propagation the creation of farms in the species' natural habitat? Will some individual come one step closer and produce viable eggs? When will we be able to raise these animals to adulthood and develop a lineage of true captive-bred Black Pythons? Hundreds of species go extinct every day. In the case of Boelen's Pythons, we sometimes wonder if we are meant to know more about them. Not long after they were discovered, they vanished back to the clouds from which they had emerged. Regardless, we intend to remain with them wherever the journey leads...

Acknowledgements

Special thanks to friend Al Baldgo for an adventure of a lifetime and JC2 Animated for taking on a great project.