

Invasive Snake Species

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Introduction

Invasive species represent an ecological and biological threat to native fauna and flora. Almost every continent has experienced the threat from invasive species, but some have had more deleterious effects. In every instance, the strategies used to deal with the invasive species must consider the ecological, biological, political, economic, moral, ethical, and social impact of the efforts. No solution is perfect, and none will please all the stakeholders, but inaction is not an option. One of the best examples of the complexity of action plans for invasive species are the Galapagos Islands. These islands represent a unique environment with isolated native species that are not found anywhere else in the world. Over the years these species had faced significant threats from invasive rodents, goats, and domestic cats, which had an impact on the native plants and animals. Drastic measures ranging from trapping to hunting and baiting were used to eradicate some of the invasive species. Many of these plans were met with great opposition from certain groups that argued against the eradication of invasive species, or the methodology used. Nonetheless, the Galapagos Islands represents one of the best success stories on eradication of invasive species and subsequent improvement in the habitat with re-introduction of native species.

In North America, the state of Florida has recently faced the threat of invasive snake species just like in Puerto Rico. They have instituted an eradication program to help deal with invasive snakes. The problem in Florida has been largely isolated to the southern portions of the state but the range of the snakes has been increasing over the years. Key elements for invasive reptiles to thrive in non-native habitat are temperature, the type/quality of the habitat, and food availability. When these conditions are met, invasive reptile species can breed in large numbers and their eradication can be extremely difficult if not impossible. In the specific case of Puerto Rico, the island represents an ideal location that provides all key elements for invasive reptile species to thrive. Puerto Rico has tropical climate year-round with ample amount of forest habitat and food sources that can maintain snake populations. The threat of these snakes is first to the native animal species, including native snakes and reptiles which can now be predated upon by the invasive species. Amphibians, birds, small mammals, and even insects are all possible victims of the invasive species. An additional threat is to domestic animals like small dogs, cats, and poultry. Based on lessons learned in other countries under similar situations, early implementation of an aggressive eradication plan is the only way to help control invasive species. These efforts often face public and political scrutiny which end up slowing down any action and allow species to spread while humans argue in courts. Unfortunately, there is no clear or easy solution and true eradication can only be achieved by active hunting and trapping of the invasive species. This of course creates the opportunity for native snake species to be inadvertently killed by those without proper knowledge to differentiate invasive versus native species. Therefore, an educational plan is an essential aspect of any eradication program.

Handling and Euthanasia

The basis for handling of snakes is to understand their weapons. For most snakes, their mouth/teeth and their body are their weapons, which means that the head and body must be restrained in that order. It is recommended to have one person for every 3 feet of length of snake for safe handling. Several instruments like snake hooks and tongues are commercially available or can be easily made from old golf clubs or metal rods. The size and weight of the snake must be considered when selecting these tools as you will see some of the invasive species can weigh hundreds of pounds, therefore the tools must be robust enough to handle the weight and strength of these animals. Most invasive snakes of concern are constrictor species which can quickly wrap around our bodies when capturing them and could lead to serious injury including death by suffocation. Therefore, it is important to work in groups to avoid injury.

Unfortunately, the only way to address the problem of these invasive snakes is through capture and euthanasia. There simply are no viable options for the placement of live snakes, especially considering the large number of animals that are invasive in Puerto Rico and Florida alone. Once captured, the snakes must be euthanized according to humane standards as set forth by the AVMA Guidelines for the Euthanasia of Animals. In the case of invasive species of snakes, because the work will be done primarily by non-veterinarians, a two-step euthanasia procedure consisting of 1. Blunt trauma to the skull followed by 2. Pithing of the brain is recommended. While this technique is visually unappealing, it is extremely effective and humane due to the small size of snake's brains and their soft skulls. A blunt object can be used to apply blunt force trauma directly caudal to the eyes on the dorsal aspect of the head. This can then be followed by inserting a sharp tool through the skull in the same area.

INVASIVE SPECIES

Below is information on the natural history, biology and identification of the common invasive species in Puerto Rico. It must be noted that the identification features mentioned are typical for the natural coloration of the species but there can be a wide range of variation in coloration, especially for captive morphs that were bred in captivity. Therefore, the goal is to recognize a species as invasive and be able to differentiate from the native species. In general terms the native species of snakes in Puerto Rico tend to be darker in color with far less contrast between the body coloration and the markings. They are also smaller and more slender than most invasive species. While the Puerto Rican boa can get up to seven feet in length, its body girth is more slender than the invasive species.

Reticulated python, *Malayopython reticulatus*

Native Country: South and Southeast Asia

Habitat: Tropical, rainforest. Usually found near a body of water. Can be found up to 4,300 feet in elevation.

Size: Can grow up to 30 feet in length and weigh 100-270 kg (220-590 lbs.)

Reproduction: ~70 days gestation with 35-100 eggs

Lifespan: ~25 years

ID features: They have brown bodies with black lines forming a diamond like pattern along their backs and scattered yellow and white pigmentation. Often have a black line on the dorsal head on midline with red to orange irises and a vertical pupil. A black line is also present running caudally from the eye to the mandible.

Burmese python, *Python molurus bivittatus*

Native Country: Southern China, Burma, Indochina, Thailand

Habitat: Rainforests, often close to water.

Size: Can grow to 15-22 feet and weigh 20-90kg (40-200lbs.)

Reproduction: ~60-90 days gestation with average of 35 eggs but may lay much larger clutches of up to 100 eggs. Females stay coiled around the eggs during gestation.

Lifespan: ~30 years

ID features: They have a brown arrowhead like marking on the top of the head with a tan line in the middle of the arrowhead marking. Bodies are tan with brown and black blotches along the back, giving them a giraffe like pattern. Females are larger than males but have smaller head relative to body size.

Red-tailed boa (a.k.a. *Boa constrictor*), *Boa constrictor*

Native Country: Mexico to Argentina

Habitat: Wide range of habitats ranging from forest to deserts and various elevations. Tend to stay in drier areas compared to the reticulated and Burmese pythons.

Size: Can grow to 10-12 feet and weigh about 27kg (60lbs.)

Reproduction: ~150-240 days gestation giving birth to live snakes as it is a viviparous species like all boas

Lifespan: ~20-30 years

ID features: Body color varies from light tan or brown to grey or cream colored with brown and black saddle bag bands along the back. The most striking feature is the transition of these bands into a red coloration near the tail. The head is light in color with a slightly darker line running down midline. They also have a broad dark brown to black line running caudally from the eye to the mandible. Cranial to the eye there may also be a broad marking that is lighter than the caudal line and fades ventrally near the edge of the maxilla, often having a square like-shape.

Ball python, *Python regius*

Native Country: Africa

Habitat: Sub-Saharan Africa with varying habitat from forest to savannah and grasslands.

Size: Can grow 4-6 feet and weigh 2.3 kg (5lbs.)

Reproduction: ~ 75-80 days gestation with up to 12 eggs per clutch

Lifespan: ~20-30 years

ID features: Body color varies from dark brown to olive with tan blotches throughout. These tan blotches often have a dark circle inside them. The head is dark brown with a light tan line that goes from the nose all the way latero-caudally to the mandible. There are over 7,500 morphs of ball pythons bred in captivity, therefore the coloration will vary significantly for captive bred animals.

NATIVE SPECIES

Puerto Rican Boa, *Chilabothrus (Epicrates) inornatus*

Size: Can grow up to 6 feet in length and weigh an average of 1-2kg (2-4lbs)

Reproduction: Viviparous

Lifespan: ~20-30 years

ID Features: Neonates have a reddish-brown coloration that changes onto their dull brown to grey coloration with dark bands/blotches in adulthood. Their bodies are uniformly slender. The head has the same coloration as the body and rarely are any faint lines noticed.

Puerto Rican Racer, *Borikenophis portoricensis*

Size: Grows to 3 feet in length and weighs 0.5-1kg (1-2lbs)

Reproduction: Oviparous

ID Features: Slender body with dark brown to gray coloration, Scales are arranged in distinct rows. A black or brown line bordered by lighter colored scales may be present along the dorsum. The ventrum, including the mandible is lighter in color than the rest of the body.