HUSBANDRY

Emerald Gems (*Corallus caninus*): Captive Husbandry and Propagation Part I: Introduction and Habitats

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Photographs by the author except where indicated.

Ranging widely across northern and central South America, with the largest known range of any currently recognized species of boid on earth, the Emerald Tree Boa (*Corallus caninus*) is among the most recognizable species in herpetoculture. Although broadly distributed, the species is nowhere common and, given the absence of empirical data to the contrary, we can only assume that population numbers are equivalent to those of the past.

Corallus caninus has long been a barometer species for biologists concerned with the ecological conditions in its natural environment. Today, the species also can be seen as an indicator of how improvements in the basic understanding of the species and the development of specific tactical skills have led to dramatic advances in herpetoculture.

Secretive, totally arboreal, nocturnal, sometimes irascible, and armed with a formidable array of weaponry, Emeralds were long considered a hands-off species fit only for professional zoologists. For decades, the species remained widely misunderstood. As eye-catching disposable acquisitions, they were used in the pet trade largely as an attention-getting loss leader, a fact that led to the premature death of many thousands of imported specimens. Today, *C. caninus* is considered one of the pinnacles of modern herpetoculture. The same refinements in husbandry practices that have led to similar successes with other challenging species provide a bright and optimistic future for the Emerald Tree Boa in captivity.

With this two-part article, I present methods honed by years of observation and practical experience. These should give anyone considering the acquisition of this fascinating species a sound basis on which to build his or her own practical strategy for success. This first installment will provide a conceptual preparation and housing considerations. Part two will present sound acquisition strategies along with the more technical aspects of husbandry and propagation, as well as a glimpse at some of the empirical data from which the suggested strategies were formulated.

INTRODUCTION

Once the decision to keep Emeralds has been made, the best chances for success hinge on solid preparations. These preparations are designed to minimize the stress for keeper and the kept in order to assure a smooth and pleasurable transition for both.

In nature, Emeralds are exclusively arboreal primary rainforest dwellers that thrive within a relatively narrow range of conditions. Until recently, this combination was quite challenging to recreate within a captive environment. Maintaining moderate ambient heat, high relative humidity (RH), and continuous air circulation was difficult enough, but attempting to balance these elements to within the specifications of a Neotropical rainforest habitat have traditionally proven all but impossible for the average herpetoculturist. As a result, even today, appropriate captive habitats are still relatively uncommon. Interestingly, however, long before the advent of hi-tech gadgetry, horticulturists had

The extent, continuity, and pattern of white markings in *Corallus caninus* vary considerably in different parts of the species' natural range (see also *Iguana* 12:2–7).

TONY NICOLI

Facility for housing Emerald Tree Boas showing vented enclosures, external lights, and pullout trays for easy maintenance.

Facility for housing Emerald Tree Boas showing tall cages with large openings that allow ready access for maintenance. Note the humidifier in the foreground; controlling the environment of an entire room precludes the duplication of control mechanisms for each enclosure.

refined techniques for the maintenance of precise atmospheric conditions in greenhouses, and these same strategies can be successfully applied to housing *C. caninus.*

HABITAT: ACQUISITION AND PREPARATION

Setting up an environment that reliably mimics conditions in the wild will minimize the stress involved in adapting your acquisition to a new habitat. The key ingredients — temperature, humidity, and air circulation — need to be brought into balance and proven to be continuously sustainable (around-the-clock and throughout the year) prior to the introduction of any inhabitant.

Habitat selection is largely a matter of personal taste and practical affordability. Although many types of caging exist, some materials are better suited to housing this species than others.

Plastics, such as acrylic and PVC, are ideal caging media in which to house tropical species. Aside from being impervious to the ravages of moisture, these materials also are able to withstand the stresses of expansion and contraction resulting from constantly changing temperatures. Additionally, many plastics are lightweight, and most forms are quite durable and easily customized. The latter quality is invaluable when making adjustments to fine-tune a newly acquired habitat. Some plastic habitats offer exceptional visibility. Others are virtually indestructible, but still manage to remain feather light. All in all, given the myriad forms and practical applications, plastics are the material best suited to the task both aesthetically and in terms of cost and availability.

Glass enclosures have long been an industry standard, providing keepers with the advantages of high visibility and invulnerability to moisture. These too are available commercially in a variety of styles and budget categories. However, glass has the disadvantages of being relatively heavy, less durable than plastics, and more difficult to maintain and to customize.

Wooden and melamine enclosures, while both popular in general herpetoculture, are less practical for use with tropical species. Extensive moisture proofing of all unsealed interior surfaces, including joints, access ports, and vents is a necessity for those wishing to utilize these materials. Wood, being inherently hygroscopic (readily absorbing moisture), attracts and absorbs moisture much like a sponge. Even when covered in melamine, moisture will seep into joints, finding any chink in a unit's waterproofing. Once absorbed by the unprotected wood, moisture causes damage via swelling, and deformity, and ultimately rots the unit. Additionally, the relatively high weights of these materials combined with their extreme vulnerability to the fluctuations in temperature and humidity required by tropical species are serious disadvantages that offset the benefits of low initial cost and high customizability.

Practical considerations useful in assessing the desirability of a particular unit are its overall dimensions, visibility, accessibility, and ventilation and thermal properties.

- **Dimensions:** *Corallus caninus* requires little actual space in which to reside. Vertical space should be the primary consideration when evaluating possible caging. Large adult specimens rarely exceed 2 m in length, and even these rare giants can be comfortably housed in units with as little as 30% of their body length in height. However, any enclosure should be of sufficient volume to allow for perching at different levels, as this metabolically slow species requires nightly exercise in order to optimize its digestive processes. An average 1.8 m-long adult will be completely comfortable in a unit measuring 45 x 45 x 65 cm (approximately 18 x 18 x 25 in, with the greatest dimension in height).
- **Visibility:** The day/night cycle within the Neotropical range of *C. caninus* varies little, and a year-round 12/12 formula will fulfill the species' physiological needs. Enclosures constructed of opaque materials may require in-cage lighting if ambient illumination is inadequate. Some cage designs provide screened openings for above-cage lighting and heating, but such openings sacrifice some degree of heat and moisture retention. Such units generally require modification in order

to keep temperature and humidity levels within acceptable limits.

- **Accessibility:** Cleanliness is of utmost importance when dealing with tropical habitats. Fortunately, *C. caninus* is a very low-maintenance form when compared to many other commonly kept species. Nevertheless, ease of maintenance should be evaluated seriously, especially for those planning on housing larger numbers of animals. Ideal units will have large openings that provide unobstructed access to any part of the interior. Fixtures such as perches and substrates should be easily accessible, and preferably removable. Slide-out substrate trays provide for easy removal of water bowls and other cage furnishings with a minimum of disturbance to the unit's inhabitant.
- **Ventilation:** Proper air circulation is crucial to maintaining a balanced tropical habitat. Too little exchange results in condensation, mold, and bacterial growth, whereas too high a rate may prevent adequate humidification and lead to respiratory issues and dysecdysis (shedding problems). The ability to easily modify a selected unit becomes most apparent in this context; the ventilation rule-of-thumb is that "the greater the inherent difficulty of modifying a unit, the greater the initial need for more than ample ventilation." Restricting airflow is always easier than creating it; therefore, glass units may need a vent as large as an entire exterior surface plane in order to assure proper airflow. Units with the best design actively utilize thermodynamics to provide a proper balance. Some units achieve this by virtue of their physical design, whereas others employ a system of fans, vents, and dampers. While both methods are effective, the latter is generally more versatile and better suited to a wider range of applications.
- **Thermal Properties:** The thermodynamic properties (relationship between heat and other forms of energy, in this case, air circulation) of a unit are largely determined by the placement of ventilation ports. Thermal gradients are essential in creating dynamic airflow as well as assuring a comfort zone for a unit's inhabitant. Because heated air rises, most units are provided with top or high-level exhaust vents. However, equally important is the supply vent through which fresh, cooler air will find its way into a unit. These "supply vents" should be located at lower levels of the unit. Ideally, both the supply and exhaust ports will be equipped with a damper.

Once a unit has been selected, the next step is to consider the basic elements that will become a permanent part of the environment. Appropriate hardware elements will be functional and durable. Environmental controllers, fans, humidifiers, heat sources, lights, water bowls, perches, and even substrate materials and cover vegetation should all be given the same degree of earnest consideration previously focused on unit selection.

Whereas aesthetic considerations will influence the selection of cage furnishings to some degree, the most ergonomically efficient minimalist designs require less of virtually everything. Focusing on the inhabitant as the primary attraction and minimizing the number of decorative items will minimize maintenance time and allow for greater budget flexibility, especially when considering larger colonies.

Adult male *Corallus caninus* showing the slit pupils associated with nocturnal activity, the heat-sensitive pits that locate prey and direct strikes even in the absence of light, and the characteristic posture assumed by Emerald Tree Boas.

By contrast, naturalistic enclosures mimicking the natural environment of the occupants provide stunning visual displays that enhance interest and promote an appreciation for the beauty and symbiotic nature of the species and its natural habitat. However, each additional layer of complexity in design adds to the level of maintenance required for both the inhabitant and the habitat to remain in optimal health.

Depending on the nature of the facility, minimalist habitats within environmentally controlled rooms may consist of as little as two perches and a water source. Although such setups have proven ideal and are commonly parts of larger collections, the majority of herpetoculturists employ environmentally independent self-contained habitats. Such units require additional hardware to achieve and sustain the continuous levels of temperature and humidity necessary to maintain Neotropical

Adult male *Corallus caninus* demonstrating the color and "personality" that causes these snakes to be so prized by hobbyists.

FRANK FUSARO

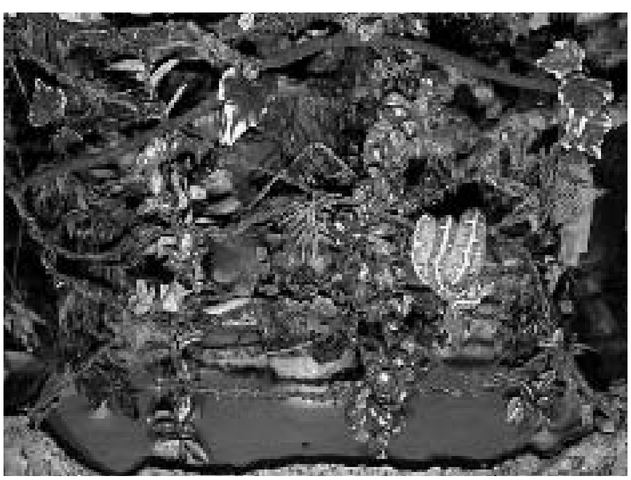
A naturalistic enclosure for housing an Emerald Tree Boa; note the low air intake, high vent, and large water bowl.

ROLANDO BURGOS

Naturalistic enclosures can provide a sense of the interactions that occur between a tropical snake and its natural environment.

ROLANDO BURGOS

Naturalistic enclosures can be striking, but the inhabitant is often less evident than in minimalist enclosures.



ROLANDO BURGOS

Complex naturalistic enclosures require considerably more maintenance than minimalist habitats; prospective snake owners should consider the extra time and effort required before committing to such an endeavor.

species. The use of either interior heating devices, such as radiant heat panels, or external heat sources, such as ceramic heaters, bulbs, or under-cage heating pads, are common. Of necessity, this type of equipment must be regulated. Thermostats, hygrostats, or the simple regulation of voltages via analog rheostats are all in common use, and all are known to be effective, although the latter is a far less reliable option.

Initial acquisition of only the most basic essentials is a cost-effective and flexible position from which to begin testing the environmental properties of a chosen habitat. Limiting initial purchases to just these items allows for options to be considered as specific need arises, as opposed to committing oneself to as yet unproven combinations.

For example, one might begin with the acquisition of an enclosure, a radiant heat panel, and a proportional thermostat. After setting up the unit including any proposed cage furnishings, one can begin to stabilize the environment to within the tolerances recommended for the species. A target range of 29 ± 1 °C at 65 ± 5% RH (the maintenance section in part II of this article will provide a full breakdown of the seasonal climatic cycles) stably maintained on a round-the-clock basis under both lighted and unlighted conditions is optimal. If temperatures within a unit are adequate but humidity levels are too low (the most commonly encountered situation), one can consider options for augmenting the RH according to the nature of the habitat. The addition of an under-cage heating unit (*Flexwatt*, heat tape, heating pads) will help raise RH levels in any configuration in which water or a water container comes into contact with the cage floor or substrate. An ideal balance occurs when the under-cage heater is controlled by the same controller used to regulate the radiant heat panel, although this is not always possible. Air stones, foggers, waterfalls, and even full-blown automated misting systems are all proven options for raising RH levels. Various alternatives in all of these categories are commercially available and limited by the usual constraints of aesthetics and budget.

Another common scenario involves the formation of excessive levels of visible condensation when temperatures and humidity are sustained within the optimal range. In order to solve this problem, a basic understanding of why condensation forms is necessary. Warmer air is able to hold a greater amount of moisture than cooler air. When warm, moist, slow-moving air inside an enclosure comes into contact with a relatively cool surface (such as the walls of the enclosure), it begins to cool. Once that air cools below its capacity to hold its current moisture load, it "gives up the excess" in the form of condensation that subsequently forms on the cooler surfaces. Since reducing the overall RH below Neotropical standards is not an acceptable option, in order to prevent condensation, air circulation must be increased. Augmenting the movement/exchange rate of air within the enclosure decreases the amount of time that any particular air mass is in contact with the afore-mentioned cooler surfaces. This reduced contact translates into a reduction in cooling and an increase in the evaporation rate within the enclosure, thereby decreasing the formation of condensation.

Air circulation within a habitat can be enhanced in many ways. These options, once again, are limited by considerations of aesthetics and affordability. The use of external ventilators, such as reciprocating fans or individual unit-specific exhaust fans (computer case fans are a commonly employed solution), is an extremely efficient and cost-effective strategy. Habitat modifications that enhance the thermodynamic properties of a unit, such as the introduction of additional venting or the augmentation of existing vents with dampers, is likewise effective. In some cases, simply modifying or adjusting the balance or manner in which internal/external heat is applied (because warmer air rises, a reduction in heat at the upper levels of a cage will cause the warmed air at the bottom of an enclosure to rise and seek to escape, resulting in increased circulation) can be a very effective form of thermodynamic modification.

Once construction and setup have been completed and a habitat has been fully stabilized, the most time-consuming and nearly all of the most demanding work has been done. Successfully accomplishing this goal prior to the acquisition of an actual animal will give you the best possible chance of keeping your prized acquisition in peak condition. In the next installment, I discuss how to acquire a healthy specimen and specifically how to go about giving it exactly what it requires throughout its life to thrive and even reproduce. I think you'll be pleasantly surprised at just how little actual work is required — once you've completed the tasks that we covered in this installment.

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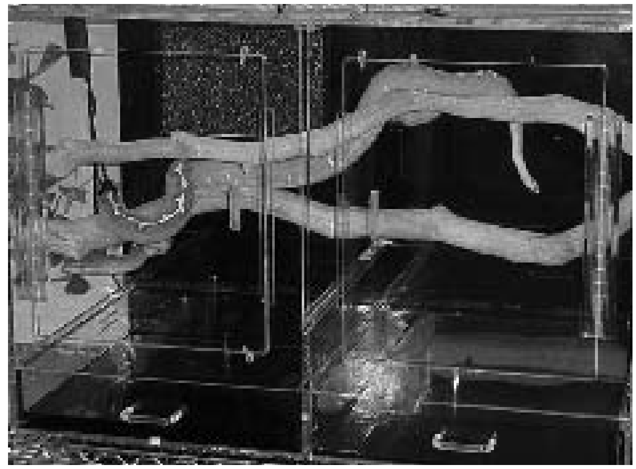

Minimalist enclosures work well and are easily maintained.

Easily modified, lightweight plastic enclosures with perches at several heights facilitate maintenance of proper temperature and humidity.

Minimalist enclosures appropriately emphasize the inhabitant.