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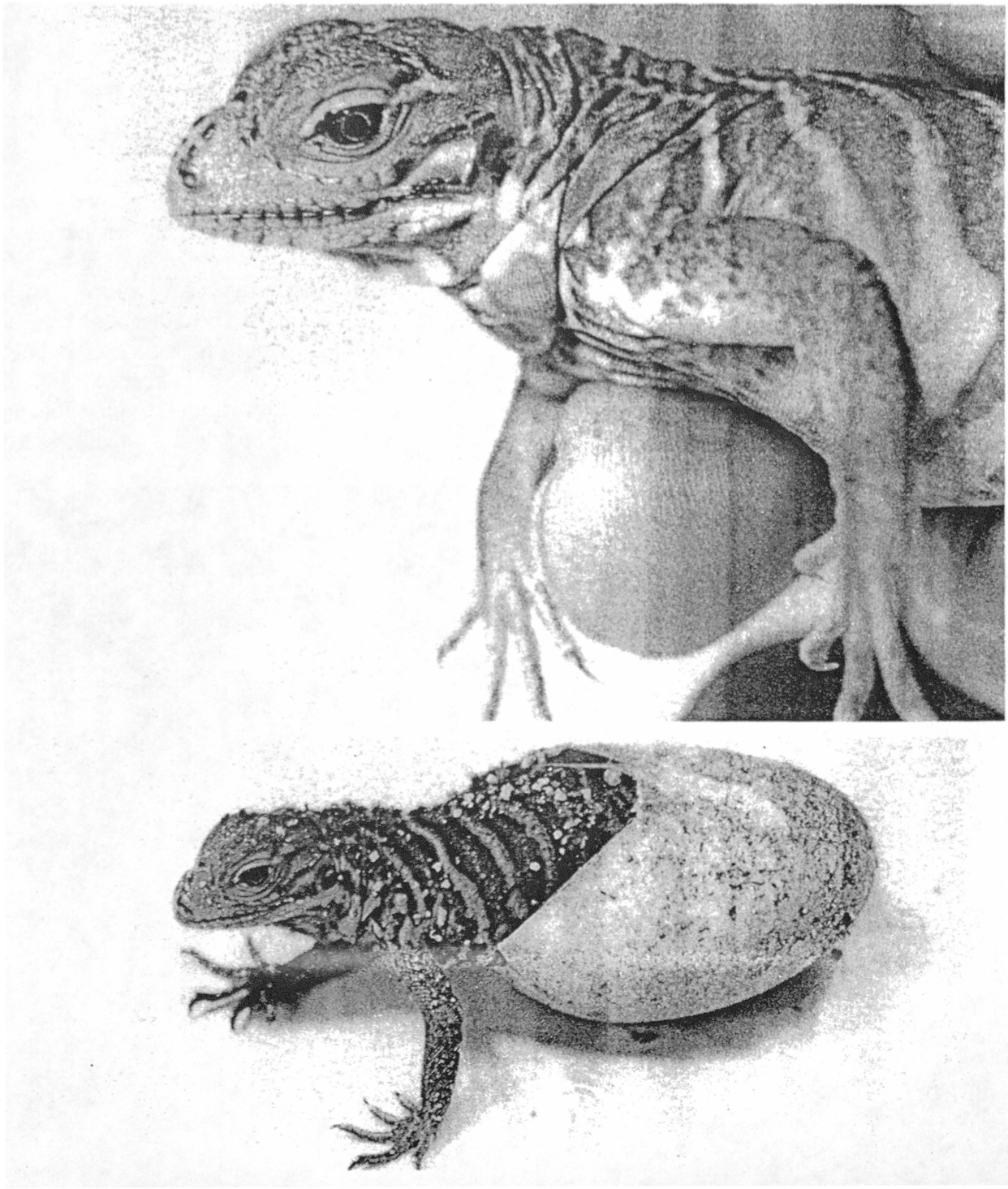


Hatching of a Rhino Iguana, *Cyclura cornuta*, October 1992. *Photograph: Ron Harrod*

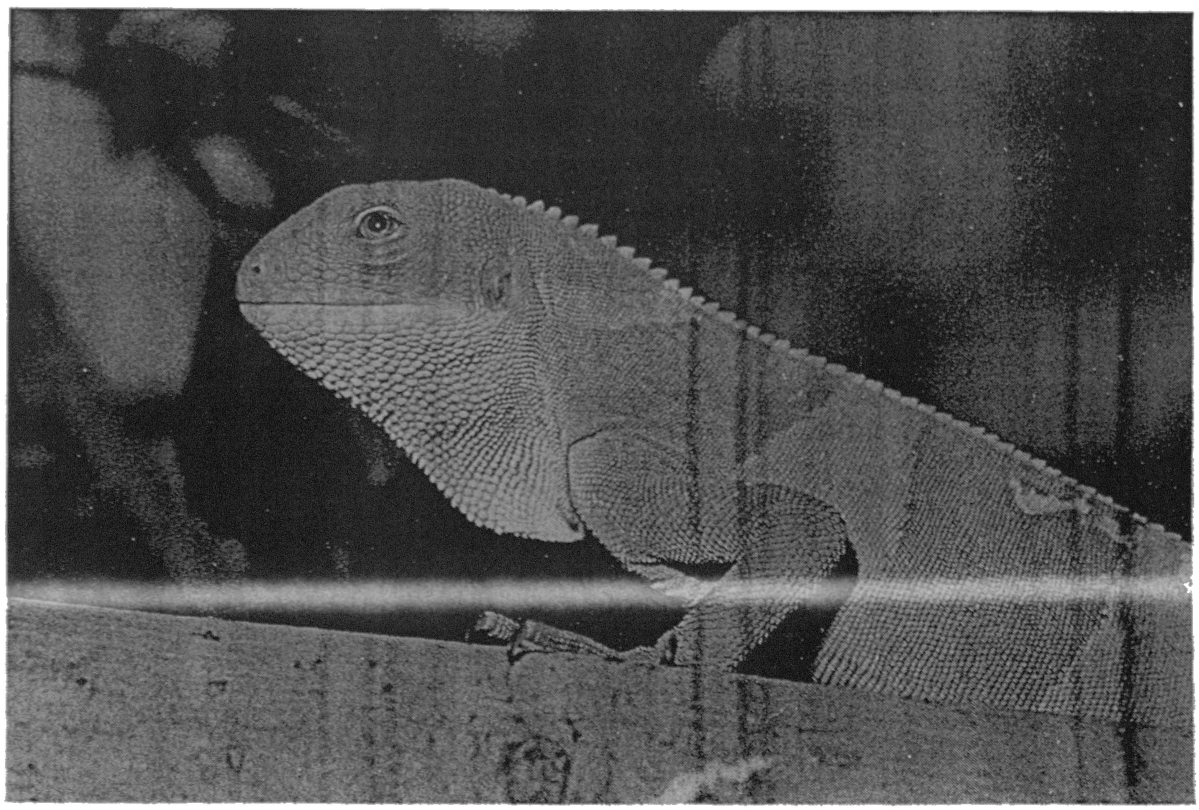
FIJI BANDED IGUANAS
GEMS OF THE SOUTH SEAS

BY DAVID BLAIR

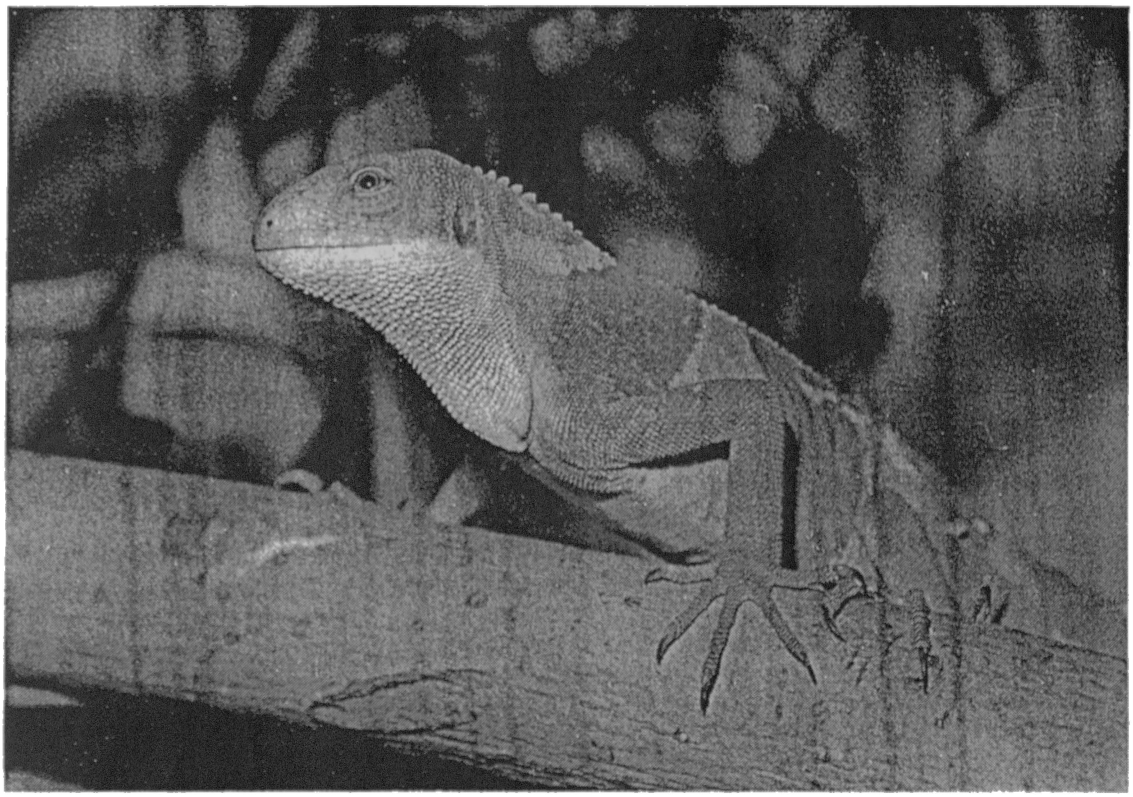
Few creatures on this earth can equal the brilliant coloration and delicate beauty of the South Pacific banded iguanas. These members of the genus *Brachylophus* are native only to islands in the Fiji and Tonga groups, thousands of miles over open ocean from their nearest relatives in the Americas. In fact, they are the most isolated members of the Iguanidae, their ancestors probably first reaching the South Pacific by rafting on floating vegetation transported along by the South Equatorial current.

Until recently, the genus was considered monotypic with only one species, *B. fasciatus*, recognized. Its common name, Fijian Banded Iguana, stems from the fact that in this species the male's emerald green coloration is broken by two or three broad (up to 2 cm. wide) vertical pale blue bands. Females almost always lack any banding pattern and have a smaller head and smaller, paler throat fan than the male. Both sexes have a uniform yellowish-green ventral coloration and red-orange eyes. Adult males average 16.6 cm. in snout-vent length, with females slightly smaller at 15.7 cm. snout-vent length. However, since the female has a longer tail than the male, both sexes reach approximately 70 cm. in overall length. Females also lack the male's prominent femoral pores.

Even though this species is widespread throughout Fiji and Tonga and has been introduced on Vanvatu (formerly New Hebrides), it is rarely seen in the wild and its habits are poorly known. In fact, as of 1981, it was believed that this lizard had never been photographed in its natural habitat! *B. fasciatus* has, however, been kept and successfully bred at several institutions including Toronga Zoo in Australia, San Diego and Knoxville Zoos in



The Fijian Banded Iguana, *Brachylophus fasciatus. Photograph: David W. Blair*



the U.S., and at Orchid Island cultural Center, Suva, Fiji. These programs have provided us some information on its captive behavior. Apparently, males are extremely territorial and communicate to other iguanas by a series of brief bursts of rapid head bobs and highly individualized sequences of slow bobs. They are also capable of rapid color changes when aroused, involving a darkening of the green background color which increases the contrast with the vertical blue bands. They also display pronounced profile changes, enhancing their apparent size by extending the throat fan, vertically expanding the torso, and raising the dorsal crest.

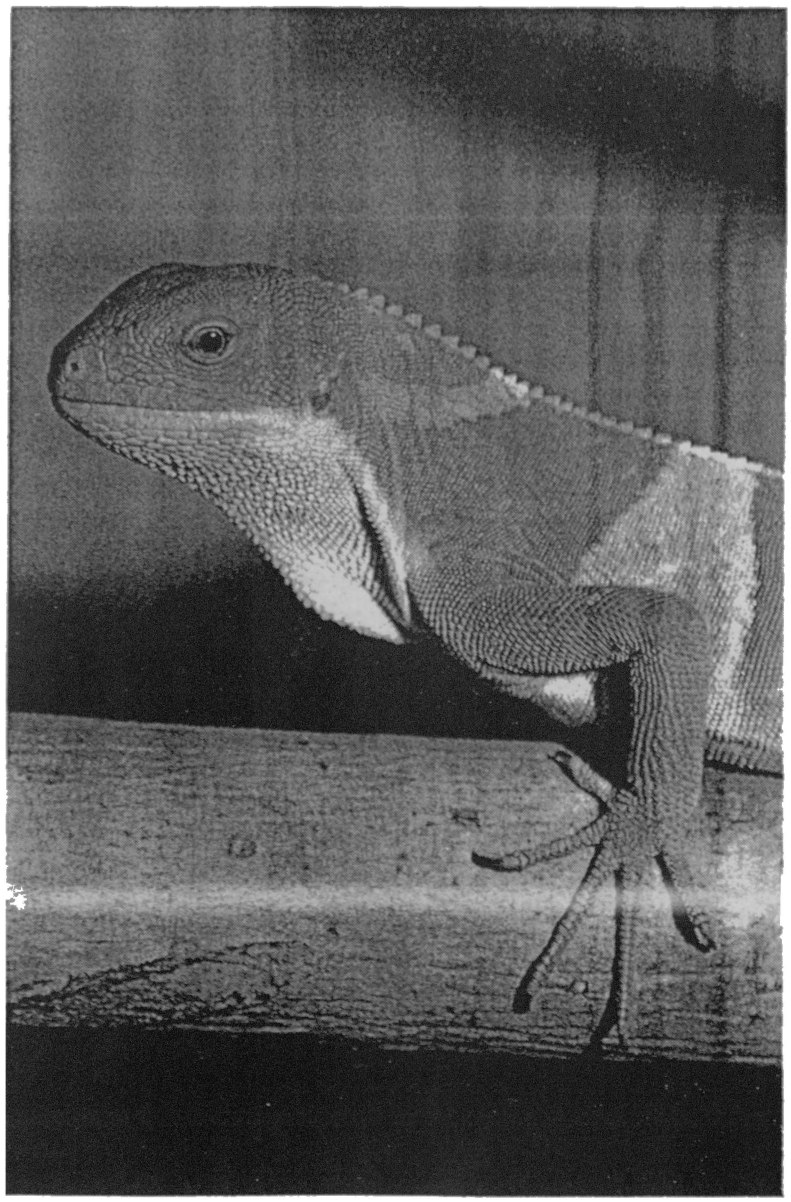
Banded iguanas kept in semi-natural captive conditions in Fiji begin mating in November and this activity often involves multiple copulations. Six weeks following the last copulation eggs are laid in a burrow approximately one body length deep which the female digs in a carefully selected site in loose soil. At the Orchid Island Cultural Center in Fiji, clutch size ranges from three to six, with an average of four eggs. San Diego Zoo has seen clutches from one to ten eggs, with an average of five eggs. Their breeding season is also somewhat different in southern California, with most eggs laid between April and July, although occasionally nesting has occurred as early as January or as late as December. San Diego Zoo females have laid eggs in their second year; however, fertility in these first clutches may be low. This species lays its eggs at the entrance of the nest burrow and then carefully pushes them with the forefeet to the rear of the chamber. Eggs are characteristically placed side by side in rows two-wide. Incubation time is incredibly long in comparison with other iguanids, taking from 18–30 weeks (average 25 weeks) to hatch. Hatchlings range from 19.8–21.3 cm. in overall length, 7.3-7.7 cm. snout-vent length, and weigh from 8–12 gm. They can usually be sexed soon after hatching by the distinctive vertical blue bands in the males.

In January 1979, John R. H. Gibbons from the University of the South Pacific, Suva, Fiji, visited the tiny island of Yaduataba in the northwestern section of the archipelago. He was exploring remote islands in an effort to expand the known range of the banded iguana. Instead, he found an iguana which differed substantially from any known specimens. Close examination revealed it to be a new species never before described. It was given the name *Brachylophus vitiensis* or "crested iguana." The 0.7 km (173 acres) island supports

several hundred iguanas in pockets of primary forest mainly on its western slope. Although uninhabited by humans, there has been extensive tree cutting and burning and there was a large number of feral goats present. Two years later, in January 1981, four more crested iguanas were discovered on Matacawalevu Island in the Yasawas, about 100 km. west of Yaduataba. In fact, one was even featured in the motion picture "Blue Lagoon."

B. vitiensis differs markedly from *B. fasciatus*. It is a larger animal, with both sexes reaching a snout-vent length of 18.5–22 cm. and a total length of up to 87 cm. There is also very little sexual dimorphism. Both males and females have a light green background color with two or three narrow vertical white bands less than 1 cm. (average .6 cm.) in width. They also sport a much taller dorsal crest with conical spines reaching 1.2 cm. high. In fact, the only difference between the sexes appears to be the larger femoral pores and gular pouch of the male. The iris of the eye is pinkish-gold and the throat fan is large and square. When agitated, this species changes very rapidly to a gray or jet black coloration, although the return to their normal state takes substantially longer.

In contrast to *B. fasciatus* which consumes insects as well as vegetation, adult *B. vitiensis* appear to be totally herbivorous in the wild. In captivity, juveniles will, however, take some insects and are much more voracious feeders than their banded counterparts. The reproductive habits of crested iguanas also show substantial differences.



The Fijian Banded Iguana, *Brachylophus fasciatus*. *Photograph: David W. Blair*

They usually mate in March and April and lay three to four large (c. 3.6 cm. long) white eggs breadthwise in a single line in a horizontal burrow and are then buried. As might be expected, hatchlings are also larger in this species (overall length 27.7–28.8 cm., snout-vent length 8.3–8.5 cm., weight 18.3–20 gm.) and incubation goes even longer than *B. fasciatus* — approximately 35 weeks!

B. vitiensis inhabits only the northern rain-shadow islands with precipitation less than 180 cm. per year. They seem unable to survive on the more mesic islands which comprise most of the remainder of the Fiji group. The majority of these islands receive substantially more than 200 cm. of rain per annum and are somewhat cooler, dropping to less than 16°C on some nights.

There are several islands, including Malolo Leve, which are inhabited by *Brachylophus* that appear to be intermediate between *fasciatus* and *vitiensis*. Further investigation may name additional species or subspecies in this genus.

Both species of *Brachylophus* are considered endangered, and their general decline has been observed for several decades. The exact reasons for this decline are not fully known, but are generally considered to be habitat loss including the felling of many native trees and the introduction of predatory feral animals, notably cats, dogs, and possibly the Indian mongoose. Competing animals such as pigs and goats have also had a devastating effect on native vegetation, especially on small islands. Despite attempts to educate native Fijians, iguanas are still feared by many and are often killed on sight when encountered in the bush. It is doubtful whether the $50.00 fine for poaching or illegal export has provided much protection for animals in such desperate need of more stringent conservation measures.

South Pacific banded iguanas are still uncommon in U.S. collections. Virtually none of the estimated 50–100 specimens in American zoos as of 1981 were obtained with the knowledge or consent of the Fijian Government. Although some smuggling apparently still continues today, small numbers of legal animals have been imported by zoos in the last ten years from Fiji and, reportedly, also from Europe. Few of these are ever offered to the private sector, and the ones that have often command prices of up to $5,000 each. Success of several captive breeding programs in the U.S. and Europe may someday allow this situation to change.

In captivity, these iguanas require spacious, well-planted enclosures providing secluded spots for females, and large areas for the territorial males. A minimum cage size for an adult pair should be 1.5 m. long × 1.5 m. wide × 1.5 m. high. Several sides of the cage should be screened to allow adequate air circulation. Numerous sturdy branches for climbing must be included and should be as thick as the lizard's body so they may bask comfortably under overhead lights and heat sources. The cage bottom substrate can be peat or sphagnum moss which is sprayed on a regular basis to keep it moist and provide relatively high humidity.

Only nontoxic plants should be used to landscape the cage. One of the best is hibiscus, along with *Ficus benjamina*, *Pothos*, *Philodendron*, and *Nephthgtis*. The iguanas will browse on the leaves and flowers of these plants, so they may have to be rotated in and out of the enclosure on a regular basis. A shallow bowl of fresh water must be provided at all times, but should not be depended upon as their only source. They must also be misted at least every other day, and they prefer to lap the drops off of leaves and branches. A small hand-pump sprayer works well for this purpose and may also be used to wet the moss on the cage bottom.

Banded iguanas are known to tolerate low temperatures of at least 16°C (61°F) in the wild, but most institutions in the U.S. choose to keep them at least 22.2–26.7°C (72–80°F) at night, raising temperatures to 26.7–29.4°C (80–85°F) during the day. A hot spot of about 90°F (32.2°C) should also be provided. Natural sunlight is essential for the long-term survival and well being of these iguanas, and artificial lighting should never be relied upon solely for long-term maintenance.

Fijian banded iguanas are omnivorous in captivity and apparently also in the wild, consuming fruits, flowers (particularly the stamens), leaves, and various insects. The proper diet in captivity consists of a mixture of well chopped green leafy vegetables (chard, parsley, turnip greens, mustard greens, beet greens, collard greens, kale, dandelion leaves, etc.), grated squash and carrots, two or three chopped fruits (apples, pears, grapes, melons,

tomatoes, mangos, bananas, papaya, etc.), and a variety of insects including crickets, mealworms, butterworms, waxworms, hornworms, and silkworms. Other foods offered may be alfalfa, bean sprouts, broccoli, hibiscus (leaves and flowers), mulberry (leaves and fruits), strawberries, blueberries, dandelion flowers, and daisies. Food must be dusted with a vitamin supplement and calcium carbonate on a regular basis. Gravid females can also be given neonate mice and small amounts of softened monkey or primate chow or low fat premium dog food. Banded iguanas often prefer not to leave their perches to feed from a bowl on the bottom of the cage and small feeding stations up in the branches are often utilized more. Insects are best fed one at a time by hand in forceps held 2–4 cm. in front of the iguana's face. For giving additional vitamin or calcium supplements or for animals that are initially reluctant to feed, pureed fruit or baby food may be offered from an eyedropper or syringe (needle removed) held directly to the animal's mouth.

Clearly, care of the South Pacific banded iguana is more like that for the true chameleons than that for most other large iguanids. If special attention is not given these somewhat delicate lizards, they will not thrive, but with proper housing and care, they may live many years and reproduce well.

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In Memory of
John R. H. Gibbons

His dedication to, and knowledge of, South Pacific banded iguanas may never be equaled. He will surely be missed.

ATTENTION IGUANA OWNERS...

Any demised *Cyclura*, and also *Ctenosaura* and *Iguana*, are needed to prepare skeletons for a systematic research project. Please consider donating your deceased animal to science! *Cyclura* skeletons are few and especially needed. All shipping expenses will be paid. Please contact Dr. Richard Montanucci c/o I.I.S. Thank You.

The Editors

ROATÁN ISLAND SPINY-TAILED IGUANA

IIS member Karen S. Mora reports recent sightings of the Roatán Island Spiny-Tailed Iguana, *Ctenosaura oedirhina* on the island of Roatán and its satellite islands. Roatán is the largest, at 25 miles long, of the Bay Islands off the coast of Honduras. The Spiny-Tailed Iguanas of Roatán were long considered to be *Ctenosaura bakeri* which is the Spiny-Tailed Iguana found on Utila Island. Utila Island is located 20 miles west of Roatán. In 1987, de Queiroz pointed out the distinctiveness of the Roatán iguana and described them as *Ctenosaura oedirhina* (de Queiroz, 1987).

The Roatán iguana is considered a rare spiny-tailed iguana and is still subject to hunting. *Ctenosaura oedirhina* is a medium size spiny-tailed iguana with males being larger and probably reaching 2 feet in total length. Karen Mora described them as light brown to dusty grayish tan with dark brown or black mottled stripe across the neck and striped all the way down the back to the tail. The blunt head is covered with bumps. The Roatán iguana inhabit low scrub forest and beach vegetation. They can be observed feeding on seagrape and the fruits of the scrub vegetation. Karen observed iguanas on small private cays, and recommends Coco View Dive Resort as an excellent place to observe *Ctenosaura oedirhina*. The resort has large areas of black boulders where the iguanas reside. The iguanas are also protected at Coco View Dive Resort, making observation easy.

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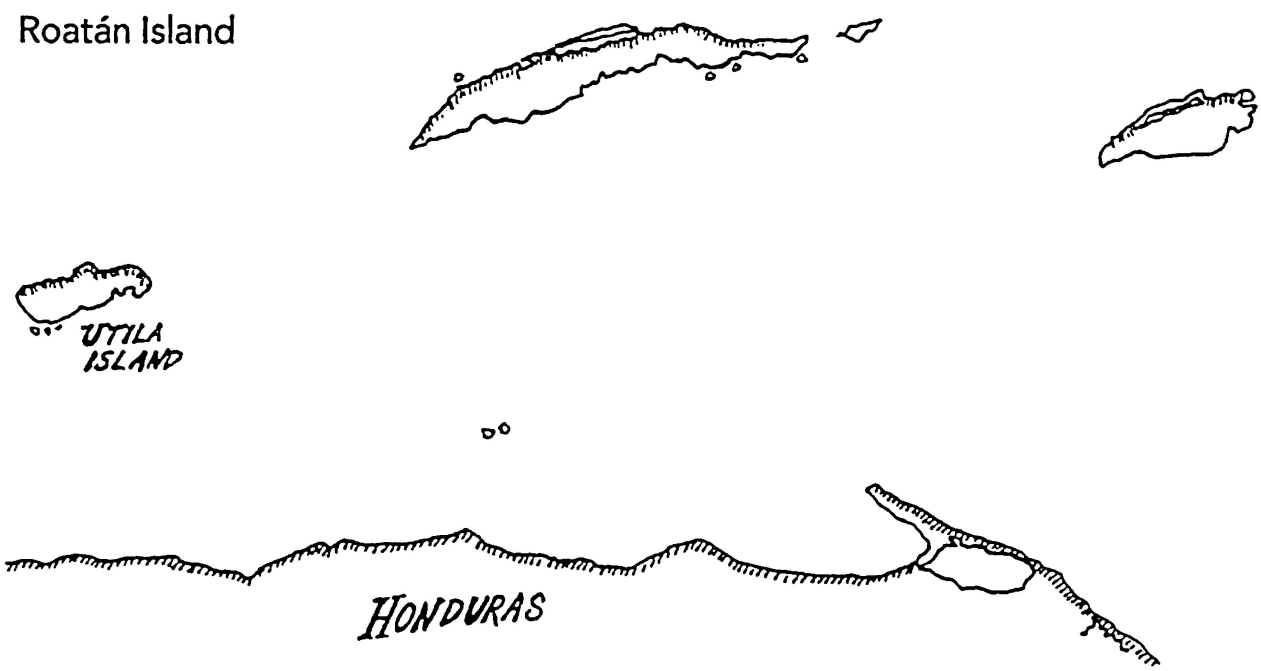

SALMONELLOSIS IN REPTILES

DOUGLAS R. MADER, MS, DVM
LONG BEACH ANIMAL HOSPITAL, LONG BEACH, CA

Recently the Centers for Disease Control in Atlanta, Georgia, published a warning to iguana owners to be on the lookout for Salmonellosis in their pet iguanas. Since this article came out our hospital has been inundated with calls from pet iguana owners wanting to know more about the disease. Some have called in a panic wanting to euthanize their iguanas for fear that their children may contract the deadly Salmonella bacteria and die.

Fortunately, although Salmonellosis is a very serious disease, with proper understanding of the problem it is one that can be managed without the necessity of euthanizing cherished family pets. Knowledge of the disease, its symptoms and its control will help veterinarians better educate their clientele.

Salmonella is perhaps the single-most infamous zoonosis associated with reptiles. There are approximately 2,000 serotypes of this gram-negative bacterium. There are three different species within the genus *Salmonella*. *Salmonella typhi* and *S. cholerasuis* have only one serotype each. The serotypes which are considered pathogenic to both man and animals belong to the species *S. enteritidis*.

Over 200 different serotypes have been isolated from reptiles, including aquatic turtles, land tortoises, lizards, snakes and crocodilians.

The red-eared slider was the terrapin that received the majority of the negative publicity. At the time that Salmonellosis was a major disease concern the slider was the most common type of turtle kept as pets in the United States. In the early 1970's it was estimated that about 280,000 cases of human Salmonellosis were contracted from pet turtles. In 1975 the Food and Drug Administration passed a law stating that it was illegal to sell viable turtle eggs or live turtles with a carapace, or shell length of less than four inches in the United States. It was felt that animals larger than four inches in length did not pose the same threat and were still legal for trade.

The disease of Salmonellosis in reptiles is usually asymptomatic. On occasion an animal may develop a loss of appetite, become lethargic or have diarrhea. More commonly, the animal appears healthy and acts as a carrier, infecting other animals and people for up to twelve months by shedding the Salmonella bacteria in its feces.

Salmonella organisms are ubiquitous in nature and are transmitted by the fecal-oral route. An example of animal to animal transmission occurs when two animals are housed together, where one has the Salmonella bacteria and its feces contaminate the food or water supply that the other cagemate is consuming. This occurs frequently in small, crowded cages. In people, contamination occurs when a person places objects or food in their mouths after handling Salmonella contaminated material without utilizing proper hygiene (eg. washing their hands with soap and water).

Salmonellosis is best diagnosed by a veterinarian. Microbiological cultures of the animal's feces, cloaca or blood may identify the organism. A positive test result is diagnostic for the disease, but a negative Salmonella culture can be misleading since the organism may not always be identified, even from a known positive animal. It is wise to recheck all negative animals two or three times, with a two week waiting period between each test, to be certain that the Salmonella organism is not present. Concerned owners are encouraged to set up a screening program with their veterinarian for Salmonellosis and other important reptilian diseases.

Since this is such a dangerous disease it is wise for all reptile and amphibian owners to use meticulous hygiene when handling or working with their animals. I give the following guidelines to all clients with questions regarding Salmonellosis, and especially to those clients where Salmonellosis has been diagnosed on a bacterial culture. It is prudent to make a note in the client's records that this information has been made available to them. If the owner has any symptoms relating to a gastro-

intestinal upset or any questions regarding Salmonellosis in humans refer them to their family physician, and once again document the recommendation in their pet's record.

A Guide to Salmonella Prevention/ Control for Reptile Owners

1. Never eat or put anything in your mouth when working with your animals.
2. Never clean cages in the kitchen or anywhere you prepare food for human consumption.
3. Always wash your hands with a disinfectant soap after handling your animals. Iodine based soaps are available from any pharmacy. Trade names such as Betadyne, Wescodyne, Prepodyne are some of the more common brands available.
4. Have your veterinarian examine sick animals, or perform necropsies (animal autopsies) on animals which die suddenly, to check for Salmonella.
5. Make it a practice to keep cages clean. Proper husbandry and hygiene are fundamental to keeping healthy animals and minimizing disease transmission (this is true for all diseases, not just Salmonella).
6. Young children and people on medical care from their physicians (such as antibiotic therapy, immune suppressive drugs, etc.) should not handle reptiles and amphibians while taking the medications.
7. If you feel that you have been exposed to the Salmonella bacteria, or if you have any questions regarding human Salmonellosis, you are encouraged to see your family physician immediately.

Salmonellosis is not a disease to be taken lightly. It is very serious and can cause death in animals and people. Since this is a zoonotic disease, and there are really no proven treatments in reptiles, our hospital usually suggests euthanizing the clinically affected animals. Although this may seem harsh, it is often a better alternative than potentially risking exposure of this disease to other animals in the household, or worse yet, to humans which come in contact with the infected pet.

The real dilemma, whether or not to treat, arises when a clinically healthy pet tests positive on routine health screens. Since many reptiles can act as carriers, and treating these animals can often result in resistant organisms, inapparent carriers and/or fulminant disease developing, I usually recommend not treating the positive animals. I do, however, recommend strict adherence to quarantine procedures and isolation of the positive animal.

Many different antibiotics against Salmonella have been tried. What usually happens with treatment is that the animal will temporarily stop shedding the bacteria through its feces, and will harbor the disease internally, only to begin shedding it again at a later date. Even animals which have microbiologically tested negative on three separate occasions can potentially harbor and shed Salmonella organisms under certain circumstances.

Our veterinary hospital treats a wide variety of exotic and non-domestic pets every day. It appears that one of our staff members came down with Salmonellosis from handling a sick animal brought to our clinic. The individual became so dehydrated from the associated diarrhea that she had to be hospitalized and placed on intravenous fluids.

Even though we are extremely careful how we handle sick animals, this incident points out that the potential disease threats from animals are real, and everyone that works with reptiles and amphibians should be extremely careful.

To put this whole problem in perspective, veterinarians, veterinary staff and owners are at a greater risk of contracting Salmonellosis from uncooked chicken than they are from handling reptiles if good hygiene is practiced. A conscious effort at maintaining a sanitary work place and animal quarters, with proper attention to personal hygiene will minimize the risk of infection with the Salmonella bacteria.

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For a comprehensive reference list on Salmonellosis see:

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THE CAPTIVE HUSBANDRY AND PROPAGATION OF THE CUBAN ROCK IGUANA CYCLURA NUBILA PART 4. BREEDING

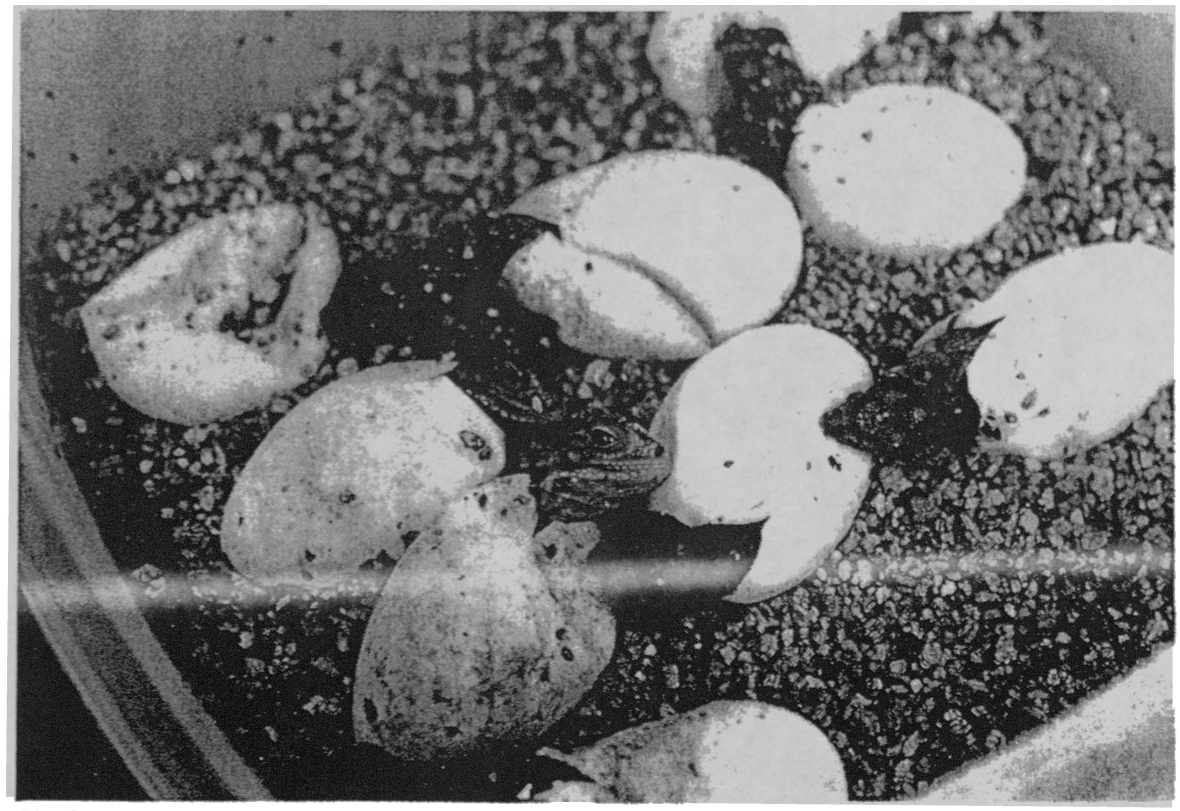
BY ROBERT W. EHRIG

The Cuban rock iguana, *Cyclura nubila*, the largest member of the genus, is probably the most adaptable species of iguana in a captive environment. Except for very rare breeding of other species (*C. ricordii*, Indianapolis, *C. cornuta*, Washington DC), it is the only *Cyclura* that has been bred by temperate-zone zoos. Only in the last decade has iguana husbandry reached the level of sophistication where reproduction occurs with any regularity. If iguanas are properly maintained in pairs for a period of years breeding activity should be expected.

I believe the main reason for the lack of success in captive propagation of iguanas is insufficient space. The essential elements for captive propagation are:

1. Space (70 sq. ft.-150 sq. ft. or more per adult pair of iguanas)
2. Appropriate photoperiod
3. Good diet (see *I.T., Vol. 1, Numbers 5 & 6*)
4. Sufficient ultraviolet light
5. Nesting area (area in which to construct a nest), or a nest box
6. Comfortable social situation (not crowded)

The photoperiod is the most important environmental cue for synchronizing the reproductive cycle of the Cuban iguana. All *Cyclura* are subject to yearly cycles of change in day length. These changes in the hours of daylight are what initiate breeding activity in iguanas. Much of our success with breeding the Cuban iguana at Finca Cyclura is due to our location at 24°6'N only 100 miles from the north coast of Cuba. Exposure to unlimited ultraviolet light in a climate almost identical to the lizard's natural habitat has allowed consistent reproduction.



Hatching of Cuban Rock Iguana, *Cyclura nubila*. *Photograph: R. W. Ehrig*

Iguanas kept outdoors in subtropical areas during the warm seasons of the year seem to be able to reproduce successfully. The photoperiods of southern California, Arizona, Texas, and central and south Florida all seem to be similar enough to their native ones to initiate breeding activity. Iguanas must be insulated against the extremes of temperatures both high and low in these areas. Extreme high temperatures (95°F and higher) for extended periods seem to lower fertility considerably in Cuban iguanas.

Sex Determination

The male Cuban iguana is much larger than the female in both overall size and in body proportions. This is fortunate since the differences in the femoral pores of the male and female are very slight. The bulge of the hemipenes at the underside of the male's tail is not as readily apparent as it is with an adult *Iguana iguana*.

Breeding

Courtship and breeding activity take place for a two week period in late April and early May. Both sexes flush with a brownish orange color. They are exceptionally attractive at this time. This orange coloration appears to be a trait of the animals that originated from the colony on Isla Magueyes, Puerto Rico. Males will display frequently and are attentive to the female. We have fewer problems with the male Cuban iguanas becoming overly aggressive at breeding time than we do with green iguanas. Copulation usually occurs in early May. The male will grasp the female at the nape of the neck and twist the rear of his body under her. Actual copulation only lasts 1-3 minutes. All iguanas usually form pair bonds when kept together for long periods of time. Cuban iguanas are more polygamous than any other of the iguana species that we breed, and they seem more adaptable than other species in accepting a new mate. We have paired one female Cuban iguana with three different males in four separate breeding seasons. In all cases the transition between mates was uneventful, breeding was successful, and fertility rates were high. Only after she laid eggs were social situations stressed and then in the form of female to male aggression. Rhinoceros iguanas, *Cyclura cornuta* in the same situation will not accept a new mate so readily. In fact, male rhino iguanas will sometimes terrorize a new female so much that she must be removed for her own well being.

Nesting and Egg Laying

About 5-6 weeks after breeding, female Cuban iguanas will initiate nesting behavior. By this time the female will appear gravid. Her abdomen will be distended and she will start to lose weight visibly in her tail and pelvic area. Gravid females eat less food than normal and then cease all feeding about 2-10 days before laying. This pre-laying fast presumably allows the last bit of growing and development of the eggs to take place before the actual laying. Females are especially susceptible to dehydration at this time and water should always be available to them.

We do not keep water containers in Cuban iguana enclosures since they are fed daily and do not usually drink. However, prior to egg laying water is offered to gravid females and they will drink. Gravid females will become restless and agitated. They will pace around their enclosure and begin to dig in the sandy areas. They will excavate a burrow in a sandy area that receives full sun for most of the day. Our enclosures have sandy areas on the southern sides. They are surrounded by rocks and boulders and the sand is 14-24 inches (35-60 cm.) in depth. This accommodates the female by simulating the area where she would nest if she were in the wild. She excavates a burrow 18-36 inches (45-90 cm.) long which ends in an egg chamber large enough for her to be able to turn around in. The burrow is just wide enough and high enough to accommodate the size of the female. The egg chamber is slightly lower than the tunnel and always has an airspace over the eggs. The female will often stay in her nest until she is ready to lay. Our Cuban iguanas have always laid in the early morning or early evening, in a dim light situation. The clutch is laid in 45-96 minutes. The female will cover the opening with sand, sometimes moving sand from all around the nest into a mound over the opening. We will offer the female food at this point, which is usually accepted. Females are almost always very exhausted but will guard their nest vigorously. I have spent many a June evening on my

hands and knees playing iguana midwife, but the process is much harder on them than on me.

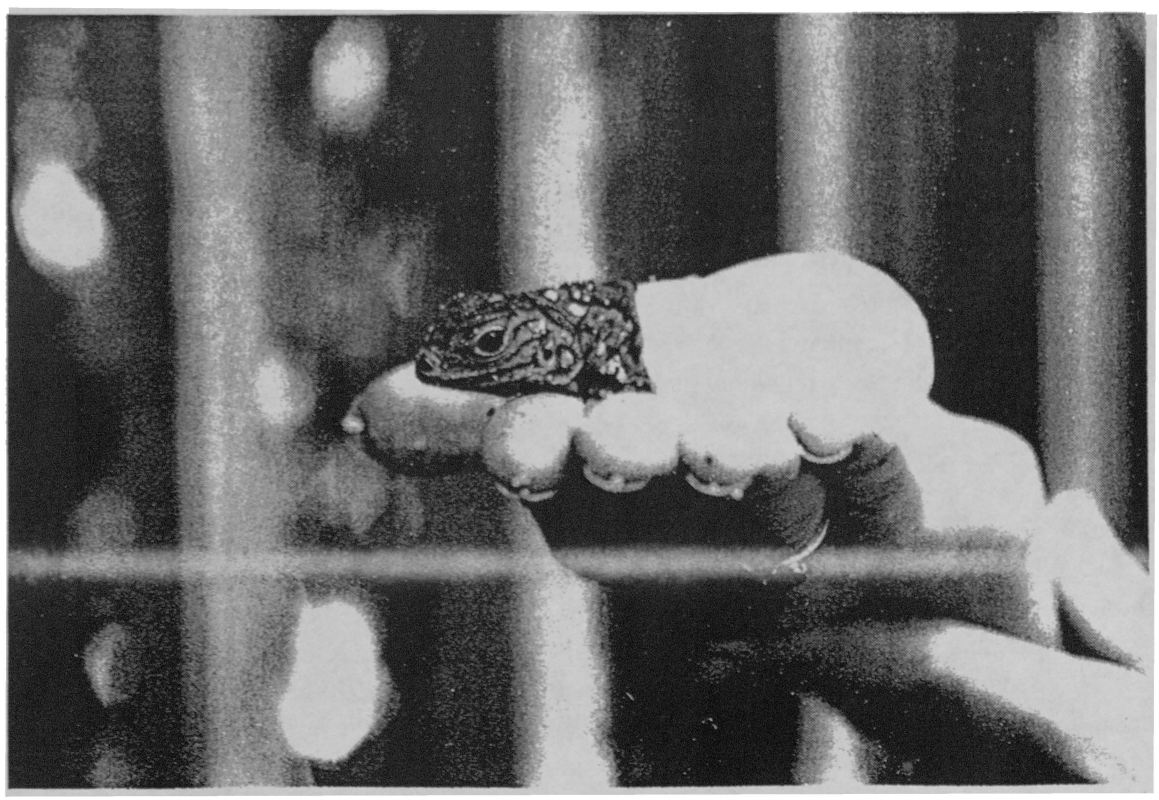
If a large area of sand is not available to a nesting female she may accept alternatives. We have had some success with wooden nest boxes. A plywood or cedar box 12 inches wide, 8 inches high, and 24 inches deep (30 cm., wide 20 cm., high and 60 cm., deep) has been acceptable to females of three different species. The nest box may be sunk in the ground or placed under the lighting system in an indoor situation.

After the eggs are laid they are placed in large Tupperware® containers on a bed of slightly moist perlite or vermiculite. The eggs are placed with the side up as they are laid. They are moved indoors to be incubated. Ideally we remove the eggs as the female lays them. This prevents us from having to dig up the nest and possibly upset the female. The female will guard the nest regardless of the presence of eggs. We have had females guard nests for 1 week (*Iguana iguana*) to 3 months (*Cyclura nubila*). A Cuban iguana laid eggs in her burrow that was used year round as a retreat. She filled it in and mounded it, guarded it for three months and dug it open 3-5 days after the neonates had hatched indoors. She performed this identical behavior for three consecutive years. In 1992 she dug her nest in another location and neither guarded so long (4-5 weeks) or opened the nest.

Fertile eggs are full, firm and white. Infertile eggs are soft or jelly-like and may be discolored. Eggs should be placed so that they do not touch each other during incubation. If one was to spoil it would not affect the others. Infertile eggs will usually deteriorate in several weeks or less. They will collapse and mold will grow on the shells. Eggs should be incubated at 87-88°F (30°C). Extra moisture that beads up on the bottom of the lid of the egg container should be blotted up with tissue. When in doubt, it is better for the eggs to be too dry than too wet. We have never lost an egg for being too dry.

At Finca Cyclura we do not use incubators to hatch iguana eggs. Since we are at the same latitude as several iguana species we are able to incubate in a room that is not cooled at all. Temperatures fluctuate between 83-93°F as they do in the wild and we have had excellent results.

Continued in next issue...



Hatching of Cuban Rock Iguana, *Cyclura nubila*. *Photograph: R. W. Ehrig*

Reproductive Statistics for Two Cuban Rock Iguanas
Cyclura nubila

Tasha Yar

1989	*Sire: Tan*	
	3 eggs laid	5 June, 1989 at 7:00 a.m.
	3 eggs hatch	1 September 6:30 a.m. - 3 September 6:00 a.m.
1990	*Sire: Raul*	
	7 eggs laid	17 June, 1990 at 7:30 a.m.
	8 hatch	7 September 1:00 p.m. - 12 September 10:00 a.m.
	(Note: 1st hatchling died 8 Sept. but 1 egg contained twins)	
1991	*Sire: Vinnie*	
	11 eggs laid	20 June, 1991 at 7:30 a.m.
	9 eggs hatch	10 September 1:00 p.m. - 15 September 10:00 a.m.
1992	*Sire: Vinnie*	
	10 eggs laid	27 June, 1992 at 7:00 p.m.
	10 eggs hatch	13 September 7:00 a.m. - 16 September 8:00 a.m.

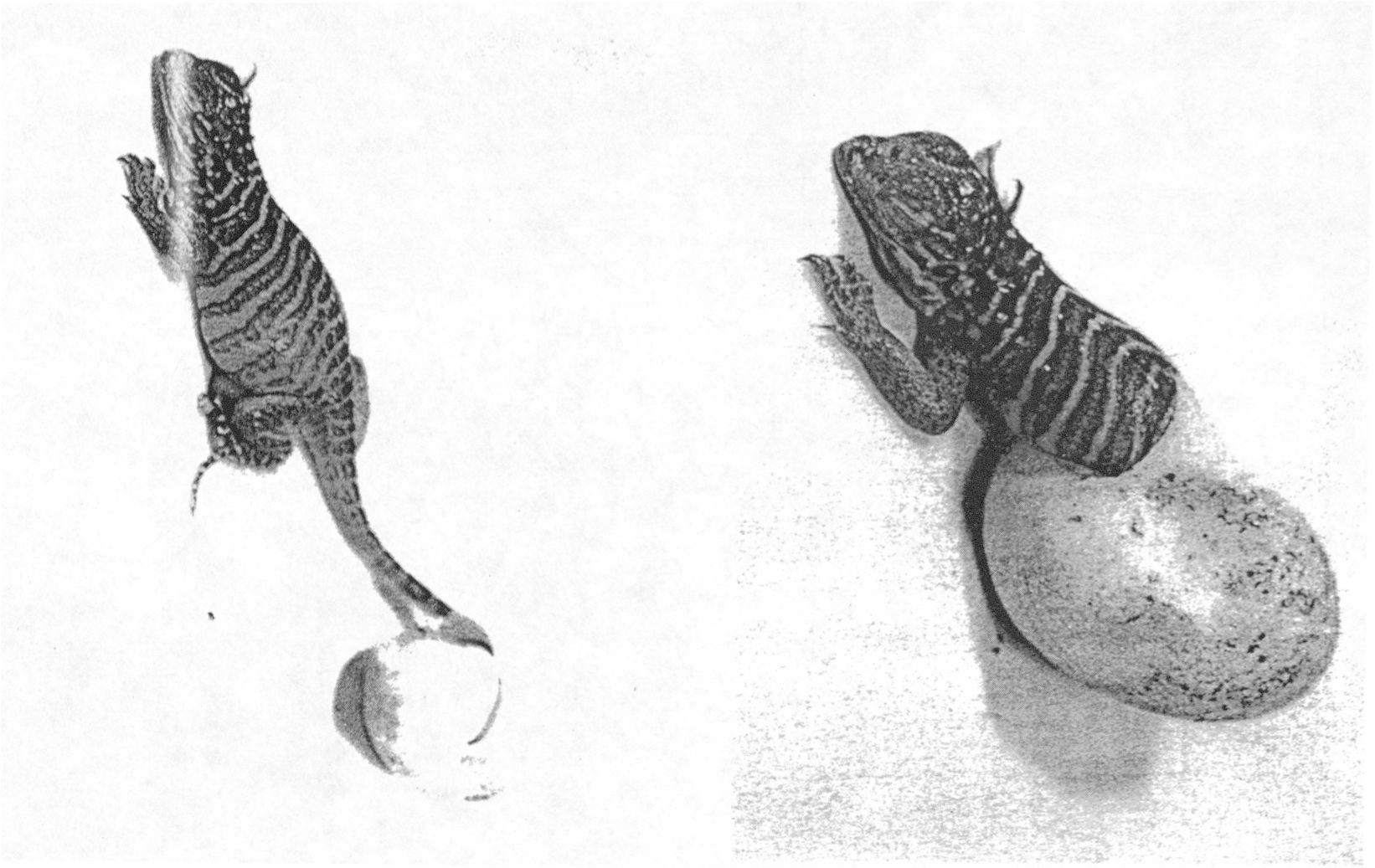
Kaylar

1989	*Sire: Worf*	
	4 eggs laid	28 June, 1989 at ?
	Infertile	
1990	*Sire: Worf*	
	5 eggs laid	25 June, 1989 at ?
	Infertile	
1991	*Sire: Raul*	
	12 eggs laid	27 June, 1991 at 4:30 p.m.
	8 eggs hatch	16 September 10:00 p.m. - 21 September 11:00 a.m.
	(Note: 2 eggs infertile, 2 eggs died, 1 hatchling died 27 Oct.)	
1992	*Sire: Raul*	
	13 eggs laid	27 June, 1992 at 5:00 p.m.
	13 eggs hatch	23 September 8:00 a.m. - 29 September 10:00 p.m.

Egg laying time rounded to nearest half hour.
Duration of egg laying 45 minutes to 96 minutes.

Incubation Period in Days

	Tasha Yar	*Kaylar*
1989	87-90	–
1990	82-87	–
1991	82-87	81-86
1992	79-81	88-94
	mean = 84.4	*mean = 87.3*



Hatching of a Rhino Iguana, *Cyclura cornuta*, October 1992. *Photograph: Ron Harrod*

Caption. *Photograph: ?*

IGUANA RESCUE GROUP UPDATE

The Iguana Rescue Group of central Florida reports continued progress in rescue and placement of iguanas. To date, 18 iguanas have been placed. 4 green iguanas are currently awaiting new homes. The rescue group has fielded many calls and questions concerning general care, husbandry, the rescue program, and IIS. The group was featured recently in the League of Florida Herpetological Society's newsletter. Success with iguana rehabilitation and placement have inspired others. The Turtle and Tortoise Club of Florida has started a rescue group of their own.

Thanks again to the many people who have provided support, especially Dr. Mark Wilson, Wayne Hill, and Dr. Richard Funk.

The Iguana Rescue Group

Florida (Central-North-Gulf Coast)

Contact
Deborah Neufeld
P.O. Box 423332
Kissimmee, Florida 34742

Janet and Dennis Truse	(407) 846-6976
Lori Sandlin	(407) 877-3024

South Florida and Elsewhere

IIS	(305) 872-9811

Rescue Group member Jan Truse with Bwana. *Photograph: Deborah Neufeld*

LIZARD LETTERS

Dear Mr. Ehrig and IIS Members,

In regard to the "Red Green Iguana" in the news-briefs of your *Vol. 1, No. 6 Iguana Times* I felt I should let you know of other "red greens." I first observed this variation as a kid back in the late 1960's at the pet department of a large shopping center in Wichita, KS. I had purchased several iguanas from this very exotic pet oriented store and had become a "regular" there. The red iguana was in all other respects a normal *Iguana iguana* except that it's head was deep red, especially around the jowls, fading to a more burnt copper farther along the body. I'd never seen anything like it and neither had any of the shop's employees.

Then in early August of 1988 I happened upon another red iguana, this time at a small surf-side bar on the west coast of Costa Rica near Manuel Antonio National Park. The bar, Julio's, had become a popular hangout for us, as the very building itself teemed with lizards including large *Ctenosaura*, Basilisks, yellow-headed geckos and of course green iguanas. He also makes the finest piña coladas in Central America and together his place makes for a herpers paradise. Julio is extremely fond of his resident lizards, knows their habits, their favorite foods and even names them. He proved to be a wealth of information on local lizard ecology.

Near 10:00 a.m. each day several large iguanas would reach optimum temperatures basking in treetops around the bar and descend to eat hibiscus flowers and leaves growing along the seaward veranda of the establishment. One of them was an enormous male whose head and neck were very red. Julio told me that the dominant males turned red for a brief two week period each summer during which time they bred and constantly displayed to one another. I've never heard of this observation but Julio's intimate knowledge of his "pets" seems unfaltering in every other detail. The male at Julio's bar were far redder than the one shown in the Sept.–Oct. Audubon magazine.

Fond memories and wild stories abound concerning the time spent at Julio's. The last time I was there, Julio was replacing a corrugated fiberglass roof panel with a sheet of tin. Shards of broken fiberglass were everywhere. When I asked what had happened assuming a coconut had pierced the roof, he told me one of the big iguanas had jumped from an over-hanging limb and crashed through the sky-light landing precisely on the bar before a crowd of dazed and horrified yuppie eco-tourists! Luckily, Julio smiled, the iguana was not hurt and ran down the bar and off into the hibiscus.

Julio also showed me how he had electrified the roof by hooking a fence charger up to the tin roof in order to keep the noisy and somewhat heavy iguanas off of the skylights. It shocked me when I grabbed hold of the roof but only because I was grounded, having both feet on the floor. The iguanas, jumping or scurrying quickly, from the tree-trunks still sat on the roof, as usual, with no apparent discomfort!

Our last visit to Julio's delighted us with the capture of a very large male *Ctenosaura* in "breeding colors." *Ctenosaura* are very abundant along the west coast of Costa Rica where locals call them garrobos. This male was boldly banded in black and brilliant turquoise blue and was one of only three or four colored in this manner amongst over two hundred individuals that we observed during our week there. I photographed my wife holding this iguana.

Best regards and keep up the fine work!

Yours,
Marty Capron
Oxford, KS

Editors Note: Several of us have observed *Iguana iguana* in Costa Rica in the area around the Manuel Antonio National Park, but have only observed very orange specimens.

Dear Mr. Ehrig,

The sixth issue was dynamite. The articles were short, sweet and right on target without wading through a lot of material. I often try to enlist iguana enthusiasts to join the society, but there are two criticisms. One is the lack of material concerning our beloved green iguana, two is that IIS seems to be preoccupied with *Cyclura*. Some are so pessimistic as to believe that it is already too late to save them and that IIS should be in the forefront of iguana information and should con-

centrate it's efforts on greens, spinytails, the American varieties including the Galapagos island species. This pessimism stems from projected population growth figures and poverty and the problems associated with such growth.

Personally, I don't think that it is too late to save some, if not most species. Keep up the good work because I am sure God is smiling at you.

Yours truly,
Dr. Timothy Durkins
593 East 164th Street
Bronx, New York 10456-6807

Dear Dr. Durkins,

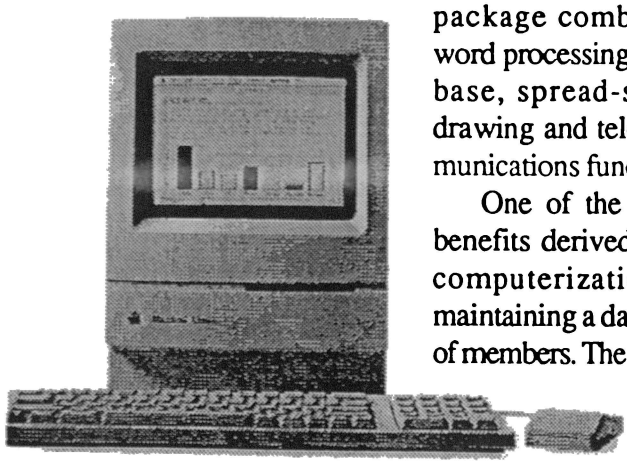
Thank you for your comments concerning Iguana Times. It is true that IIS has designated *Cyclura* as a priority genus. This is because of the critical level of endangerment of some species and the threatened and endangered status of the rest. This should not be interpreted as lack of interest in any of the other seven genera of iguanas. We are equally as concerned with the status of all iguanas including *Iguana iguana*. We are pleased that we have been able to disseminate much new information to our members, as this is one of the goals of the society. All of the husbandry and medical articles are directly applicable to green iguanas. The articles concerning the natural history and conservation of rock iguanas also help members to understand how these magnificent creatures function within their environments. All iguanas are basically variations of a theme. They all have many similar traits and their differences are a result of adaptations to the variety of habitats where they are found. The more you understand about any iguana the better you know our beloved green friend. The comment that I most hear is, "I didn't realize that there are so many species of iguanas." There are 31 taxa of iguana currently recognized, our hope is to supply our members with information on all of them. We do not believe it is too late to save all species. We are a very young organization and we face many challenges. The job ahead will not be easy but I am confident that we can make a substantial difference.

Sincerely,
Robert W. Ehrig

NEWS OF THE SOCIETY

IIS Enters the Electronic Age

Assisted by IIS members, the Society recently purchased its first computer system: an **Apple Macintosh Classic II** with 4mb of RAM and an 80mb hard disk, an **Apple StyleWriter** ink-jet printer and **ClarisWorks,** an integrated software package combining word processing, database, spread-sheet, drawing and telecommunications functions.



One of the many benefits derived from computerization is maintaining a database of members. The ability to store and sort member information, for mailing labels for example, will dramatically reduce the time and effort involved in getting *Iguana Times* to its readers. Other uses will include creating more professional looking correspondence and forms.

Members interested in submitting manuscripts on disk for *Iguana Times* should provide the following information along with their disk: **file name(s), application program and version number, and two (2) hard copy print-outs** of the file on disk. We have the ability to translate text files from many popular software packages (i.e. Microsoft Word and Excel, Word Perfect, etc.) in Macintosh or PC formats.

Any questions may be directed to Michael Ripca at (215) 626-1988.

IGUANA NEWSBRIEFS

UPDATE: IGUANA SMUGGLING SENTENCING

Tom Crutchfield, a Bushnell Florida reptile dealer, was sentenced in federal court for his recent conviction of conspiring to smuggle four endangered Fiji Banded Iguanas, *Brachylophus fasciatus*. In addition to a $10,000 fine, Crutchfield received a 17 month prison sentence.

▼

OUT OF THE EARTH

Marcie Ehrig reports hatching of hybrid Cayman Iguana, *Cyclura nubila lewisi* × *caymanensis* "in situ" at Finca Cyclura. A five year old female dug a long burrow in a sandy area in a large outdoor enclosure. After spending almost 48 hours underground, the female laid a clutch of eggs on 15 July 1992. It was decided to leave the clutch of eggs in the ground. On 1 November 1992, three hatchlings were found running around the enclosure. The enclosure was constructed of 1/2 × 1/2 inch mesh of hardware cloth which did not allow hatchlings to escape. Two more hatchlings were found in the late afternoon on 1 November 1992 and early afternoon 2 November. It is believed that the hatchlings spent 2-3 weeks underground after hatching (12-18 Oct.) 88-94 days. The parents had little reaction to the neonates which explored the area around them, apparently feeling very safe. They did react to human presence by fleeing. Hatchlings were very large. Average overall length was 11.5 inches (28 cm) considerably larger than Cuban iguana hatchlings, *Cyclura nubila*, at 2-3 weeks are 11 inches (26 cm).

▼

ANEGADA IGUANA ON GUANA

Dr. James "Skip" Lazell reports a small population of Anegada Rock Iguana, *Cyclura pinguis* thriving on Guana Island off the north coast of Tortola in the British Virgin Islands. Guana Island is a 850 acre privately owned island. The sole development on the island is a very upscale resort. The iguana population, estimated at 20-35 adults, congregates in the area around the resort, on the east coast of the island. Reproduction has been successful. Hatchlings are sometimes sighted. Nesting occurs in sandy areas adjacent to the beach.

The iguanas were reintroduced to their namesake island in 1984 with the introduction of a single gravid female. In 1985 she was joined by a group of seven additional animals (4.3). More than 100 sheep have been removed from Guana Island by conservationists. A small number of sheep remain, but the native vegetation is already recovering. The residents of Guana apparently are very attached to their iguanas. Restoration of the island to a more natural condition and protection from feral predators have allowed this largest native Virgin Island resident to thrive.

Note: Dr. Lazell feels the Anegada Rock Iguana is more correctly referred to as *Iguana pinguis*.

▼

I.I.S. Vice President, **David Blair,** was one of four invited speakers at the **First International Reptile Breeders Expo** held October 3 and 4, 1992, in San Diego, California. David's talk and slide presentation on breeding and raising green and rock iguanas was well received by the standing-room-only crowd at the icebreaker held the evening following the first day of the Expo. Numerous membership applications for both the I.I.S. and The Friends of the Jamaican Iguana were given out following the talk. The first annual two-day event was attended by over 4,000 people.

▼

The I.I.S. was represented at the **San Diego Herpetological Society's Fifth Annual Exhibition and Sale** held November 14 and 15, 1992, at the Del Mar Fairgrounds, Del Mar, California. The display featured dozens of color photographs of iguanas and newly purchased professional informational signage. I.I.S. Vice President, **David Blair,** manned the table both days and was also responsible for setting up and taking down the display. I.I.S. members, **Dan Byrd and Silvia Villagomez,** were a great help. Almost 300 I.I.S. membership applications were distributed at the event which was attended by over 5,000 people. Over a dozen new members and several 1993 renewals were signed up at the show.

Statement of Purpose

The International Iguana Society, Inc. *is a non-profit, international organization dedicated to the preservation of the biological diversity of iguanas through habitat preservation, active conservation, research, captive breeding and the dissemination of information.*

The Iguana Times, *the newsletter of the society, is distributed quarterly to members and member organizations. Additional copies are available at a cost of $4.50 including postage. Annual dues for The International Iguana Society are $25.00 for individuals and $30.00 for organizations which receive double copies of the newsletter.*

Write to:
The International Iguana Society, Inc.
Route 3, Box 328
Big Pine Key, FL 33043

Solicitations

Members of the I.I.S. are encouraged to contribute articles for publication in the *Iguana Times*, following a format like that shown in the most recent issue of the newsletter. Articles can deal with any aspect of iguana biology, ecology, behavior, husbandry, systematics, etc. Manuscripts must be typed, DOUBLE-SPACED, with wide margins, on 8 ½" x 11" paper. Include your address and telephone number on the manuscript. Members are also welcome to submit letters to the Editor for publication in future issues of the newsletter. Authors of one page or more of print are entitled to three copies of the issue in which their artide appears.

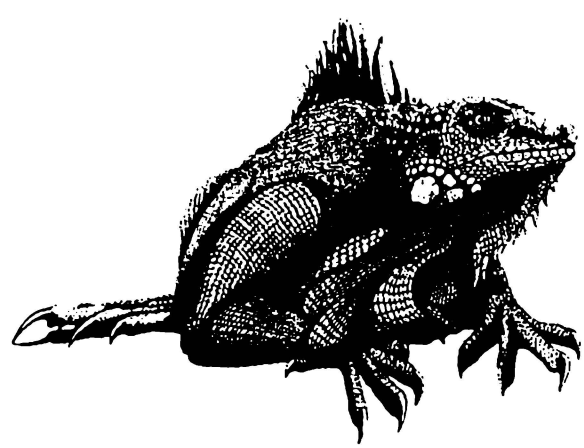
The Editors

I.I.S. Bookstore

As a service to our members, a limited number of publications will be distributed through the I.I.S. Bookstore. We believe this will become a valuable source of information. The following publications are now available:

1) **The Green Iguana Manual,** *by Philippe de Vosjoli.* 1992. **$7.00** (including postage); **$8.75** (non-members)

Write to: I.I.S. Bookstore
316 W. Mission Ave., #177
Escondido, CA 92025



THE BLACK IGUANA.