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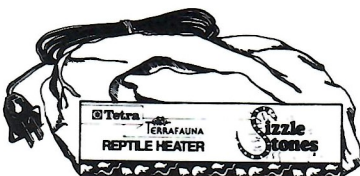
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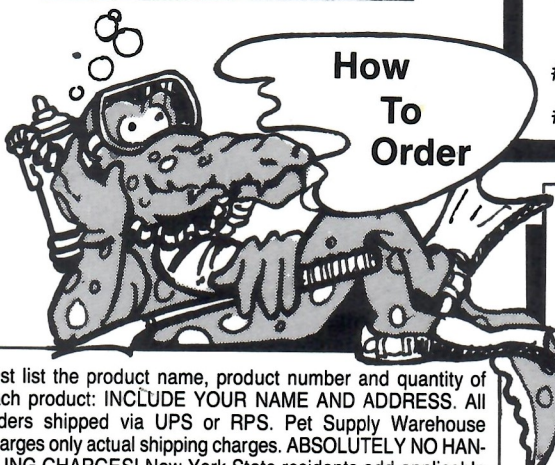
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THE VIVARIUM

Volume 2 Number 4



C O N T E N T S

F E A T U R E S

Herpetoculturists, the Pet Industry
and the Fate of the Biosphere 5
by Greg James and Joe Franke

First World Congress of Herpetology 7
by Frank Lundberg

Keeping Leopard Tortoises in Southern Arizona 8
by Richard Fife

Metabolic Bone Disease in Captive Reptiles 12
by Douglas R. Mader, MS, DVM

Small Rattlesnakes 15
by Vince Scheidt

The Hardy and Prolific Sand Boa 20
by Steven Simpson and Angela Ellis

After the Tourists have gone 25
by Kevin J. Hingley

D E P A R T M E N T S

AFH Perspectives 4

Poem: Serpentina 19

Vivarium Back Issues 19

Helpful Hints 27

Letters to the Editor 28

Ask the Expert 29

Coming Events 31

Front Cover: *Hyla rubra* is a delicate, "ghost-like" treefrog occurring in Northern South America, northward throughout Central America. The specimen shown here is from the Caribbean island of St. Lucia. This form is of uncertain taxonomic status, and the St. Lucia *Hyla* may not, in actuality, be conspecific with the mainland *Hyla rubra*. Photo by Vince Scheidt in St. Lucia.

AFH Perspectives

PRESIDENT'S MESSAGE

This issue presents an interesting article by Greg James and Joe Franke in which they make a case for an end to large scale reptile and amphibian importation. We decided to run the article as its point of view is bound to cause all of us to consider our own personal philosophical positions and values regarding wild animal importation. By publishing this article, we are also using *The Vivarium* as a forum for the expression and exchange of a diversity of ideas. We expect to receive a significant amount of reader response to this issue of *The Vivarium*. The letters and articles received will allow us to present additional points of view in future issues.

It would seem fitting that I should take this opportunity to clarify my personal views regarding the position of the AFH on the topics of herpetoculture, conservation and importation. I would like to remind readers that the views presented herein are my own and have not been condoned by, or necessarily represent, the AFH.

Regarding herpetoculture: When the AFH was founded, careful thought was given to the name of the organization and its primary goals. The AFH is the *American Federation of Herpetoculturists*, an organization whose primary goals are to support, promote and disseminate information about herpetoculture, an interdisciplinary field concerned with the husbandry and propagation of amphibians and reptiles. Another primary goal of the AFH is to help support the right of herpetoculturists to practice responsible herpetoculture. The philosophical core and banner of the AFH is *herpetoculture*. If someone is primarily concerned with the conservation of reptiles and amphibians in their

natural habitats, then they should also support conservation organizations such as the Nature Conservancy or the World Wildlife Fund.

It is important to remember that herpetoculture is the philosophical/political basis of the AFH and to carefully consider the implications of herpetoculture. Inherent to herpetoculture is the exploitation of amphibians and reptiles.

Herpetoculture cannot exist in animal welfare models proposed by the Humane Society of the United States or animal rights groups.

In these models, all wild animals are left unexploited by humans in preserves of natural habitats. That is something we all have to be honest with ourselves about.

I also think we have to be honest with ourselves as to why we are involved in herpetoculture. Recently, on television, a herpetoculturist, in the manner which has become herpetocultural fashion nowadays, stated in an interview that "with the current destruction of tropical forests many amphibians and reptiles are becoming endangered. I am trying to breed these animals in captivity to prevent them from becoming extinct". Let's be real. We don't always have to take a defensive stance about our involvement in herpetoculture and present a higher motive for the fact that we derive a great deal of satisfaction from keeping amphibians and reptiles. A more honest answer might approximate the one given by Karl Kauffeld when asked why he liked snakes. He answered, "Because they are beautiful".

Underlying the popularity of herpetoculture is the fact that the experience of observing and caring for amphibians and reptiles enriches our lives often in subtle ways that we are not

fully aware of. Caring for non-human species, can open our eyes to the endlessly diverse manner in which mind and experience is manifested in nature. Each amphibian and each reptile is not just a physical entity, but a way of experience. Learning from our interactions with other living organisms has been a primary source of knowledge for human beings since the dawn of humankind. One of the problems of modern life has been our increasing disconnection from nature. It is my hope that by caring for non-human species in our own homes, we may begin to start caring about these species in their habitats. There is now a greater awareness of amphibians and reptiles among the general U.S. population than at any other time in history. And this is to a significant degree *because* of the relatively recent developments in herpetoculture. For many of us, a fleeting glimpse of a basilisk or an iguana in a Costa Rican tropical forest preserve can only begin to convey the unique biology and behaviors of these animals. Through herpetoculture, amphibians and reptiles can teach us about and connect us with nature, much as animals have since the dawn of humankind.

So, if you are honest about being a herpetoculturist, you will want to assure that now and in the future, human beings will be able to experience amphibians and reptiles both in their homes and in the wild, because both of these experiences are at times more enriching to our lives than many of the commodities promised by the advances of our technological and industrial society. From this point of view, the conservation of amphibians and reptiles has a very direct and practical value. We do not want to lose

continued on page 14

Herpetoculturists, the Pet Industry, and the Fate of the Biosphere

by Greg James and Joe Franke

Times change, situations change, and yes, laws change. Our perspective at any given time decides whether we see a change as positive or negative, but one thing is certain: change is inevitable.

Presently, our world is undergoing major changes. The environment is being radically altered by humankind. Many scientists predict that if we stay on our present course, we humans may ultimately cause our own demise by rendering the planet uninhabitable via the greenhouse effect, overpopulation, soil erosion, forest depletion and a myriad of other problems. But if humankind faces an uncertain future, then the prospects for maintaining any sort of biological diversity on the planet are becoming even more bleak. And we must remember - lowered species diversity is symptomatic of a degraded and degrading biosphere, one that supports us as well. We, as the species that holds in our hands the fate of all species, are doing a woefully inadequate job of living up to the obligations inherent with being the dominant species on earth.

The threats to individual species and ecosystems come in a multitude of forms, including habitat destruction (undoubtedly the single greatest threat), the skin trade, pollution, subsistence poaching and collecting for the pet trade. These escalating problems have led to rising concern in both the industrialized and developing nations, amongst people and organizations that care about the natural heritage of our planet. One manifestation of this is that many laws pertaining to the wildlife trade are being instituted or altered. Laws regarding the importation of wild animals, both living (for pets, research, etc.) and dead (as boots, belts, ivory) are becoming more restrictive and



Vine snakes (*Dryophis* spp.) are a cheap, colorful pet-store offering. Unfortunately, they normally don't fare well in captivity, and die after a few short weeks. Photo by K.S. Matz.

seem to be reflecting the perceived needs of the animals themselves, as opposed to strictly human needs.

A good example of these changing laws are those pertaining to the importation of psittacine birds (parrots). According to Thomas Karl of Seattle Audubon, eleven states either have or are in the process of enacting laws that heavily regulate and even prohibit the sale of wild caught birds, and five other states are considering such legislation. The goal of these laws is to stimulate captive breeding while protecting wild populations. It is only logical to assume that laws regulating the *large scale* importation of reptiles and amphibians may also be necessary to preserve wild populations. The question is: Should herpetoculturists and hobbyists embrace these laws and support tougher restrictions on the pet trade or reject them and fight for the maintenance of the status quo?

The chief reason cited by most

people opposed to the trade in wild animals is that it has the potential to impact wild populations. Unfortunately, records of non-CITES species being imported into the U.S. are not compiled, but there have been well documented cases of gross overcollection. Included in these are the Hermann's tortoise, a species that was a mainstay of the British pet trade until laws were passed banning its importation, and more recently, the case of the Hog Island boa, a subspecies that is in the process of being extirpated from its extremely small range. In any case, we do know that millions of herptiles are imported into this country every year. For instance, one study done in 1972 reported that 2,504,093 reptiles were imported into the U.S. that year. It would seem undeniable that numbers like these must be having some impact.

Opponents of laws restricting importation for the pet trade counter

Herpetoculturists, the Pet Industry, and the Fate of the Biosphere *continued*

that habitat destruction and the skin trade have a much more profound impact on wild populations than does live collection. Undoubtedly this is true. Habitat destruction as a result of expanding human population and economic gain is the single greatest threat to wild animals today. Currently, tropical rainforests are being destroyed at an incredible rate. Figures vary somewhat, but most people agree that it is in the area of 10 to 11 million hectares a year. At current rates, most of the world's rainforests will have vanished by the year 2020, and along with them 3 to 5 million species of plants and animals.

Interestingly, those who favor lesser restrictions on the pet trade use the issue of habitat destruction to further their cause, claiming that habitat destruction is inevitable and that the best course of action is to go in and collect as many animals as possible before their ultimate demise. This kind of logic seems to make sense, were it not for a few key points. First, the destruction of the earth's rainforests and other ecosystems is *not* inevitable; it is a probability based upon current trends. These trends all have their base in human attitudes. Put simply, as long as humans behave like selfish, careless idiots, then selfish careless idiots we shall be. To sit back and smugly proclaim the inevitability of the destruction of the world's ecosystems, and to then use this as an excuse to pillage the wildlife before events have run their course, is justifying one evil with another. It's also part of a greater delusion. Our piddling little collections won't amount to much if all life on earth itself becomes impossible. We are often shocked at how much of the community of people interested in herps remains stuck in this archaic thinking. Even if it weren't for the overall ecological issues, it would seem to be behavior befitting greedy art collectors who snap up the works of a brilliant artist who's starving to death, all at bargain prices and without any appreciation from whence they came.

So where does herpetoculture fit into this picture? Not surprisingly, most of the serious herpetoculturists that we have spoken to view the *large*

scale importation of animals for the pet trade with disdain bordering on disgust. Not only is it ecologically immoral and wasteful of the lives of individual animals, it's also bad for business. As long as there is a ready source of cheap imports, herpetoculturists will have to rely on the volatile markets of genetic oddities and other rarities and will have to rely on limited collector's and breeder's markets to absorb their stock. But if the pet industry's supply of species like caimans, Senegal chameleons and vine snakes (almost all poor choices for the

giving up in disgust after a failure or two.

It behooves all of us to get involved in the reformation of the tastes of the pet trade and to start asking serious questions about the *large scale* importation of reptiles and amphibians. We need to consider the implementation of import restrictions such as shipping box limits that will allow for the limited importation of breeding stock, but will make it unprofitable for people to engage in wasteful, inhumane practices such as stuffing 1,000 or more Senegal chameleons in a box



The Senegal Chameleon (*Chamaeleo senegalensis*). This delicate species is currently being imported by the thousands annually for the pet trade. Nearly all face a certain death at the hands of inexperienced keepers. Photo by John H. Tashjian.

beginner anyway) were to dry up, then the emphasis would shift towards species such as leopard geckos and corn and king snakes; species that are easy to breed and hardy. With an increase in demand for these animals, it would be possible for many would-be herpetoculturists to make a living breeding them and ultimately, it would be the healthiest thing to happen to the pet trade, because when people purchase an animal that lives, they 1) provide steady income for the shop owner by purchasing crickets and mice over a long period of time, and 2) stay turned on to the idea of having reptiles and perhaps buy more, rather than

sardine style. We need to become actively interested in conservation issues, not only for the reason of a need to save the entire biosphere, but to be perceived as "good guys" by the conservation, humane and governmental/legislative communities, so as to have a legitimate say when that proposed total import ban or anti-reptile ordinance comes before our law makers. We need to be intelligent business people and plan for the future with our best financial interests at heart. But most of all, we need, to paraphrase the old adage, to stop being part of a very big problem, and to start being part of the solution. ☺

First World Congress of Herpetology:

United for Conserving the Resources of the World

by Frank Lundburg

From the evening of September 10 until the morning of September 19, 1989, some 1367 people from 69 nations assembled on the campus of the University of Kent in the city of Canterbury, United Kingdom. Their purpose was to share information, knowledge and concern for the understanding, science, plight, preservation and potential of the amphibians and reptiles of the world.

The First World Congress of Herpetology was the largest meeting of herpetologists ever held. Delegates to the Congress included scientists, zookeepers, professional conservationists (everyone was a conservationist), amateur herpetologists - virtually all backgrounds concerned with understanding amphibians and reptiles were represented.

His Royal Highness, Prince Philip, Duke of Edinburgh was the Patron of the Congress. Professor Angus d'A. Bellairs, author of the two volume set, *The Life of Reptiles*, and one of Great Britain's leading herpetologists, was the Honorary President. Honorary Vice-presidents of the Congress included Sir David Attenborough, creator of the *Life on Earth* television series seen on the BBC and in the United States on PBS; The Earl of Cranbrook, President of the British Herpetological Society; Mr. Gerald Durrell founder of the Jersey Wildlife Conservation Trust and world leader in captive breeding and conservation, and seen on the television series, *The*

Amateur Naturalist; and the Lord Archbishop of Canterbury; among many others.

The Congress also was host to several other herpetological events including the annual meetings of the Society for the Study of Amphibians and Reptiles, the Herpetologists League, the Societas Europae Herpetologica, and the Reptile Specialist Groups of the International Union for Conservation of Nature and Natural Resources.

The theme of the Congress was set by the welcoming letter from H.R.H. Prince Philip which was published in the Congress Program:

"Life on earth may be indivisible, but it would be impossible for any one

person to comprehend all the details of the ecology of every region and every species. The great value of this Congress is that it will fill in detailed knowledge about a particularly sensitive group of animals. It is from these bricks of specialized knowledge that we are able to build a comprehensive understanding of the state of the natural environment. This can then become the basis for effective conservation action."

The theme of conservation transcended every discussion, every lecture, every aspect of the Congress. Dr. Kraig Adler, First World Congress Secretary General echoed this theme when he concluded his opening

continued on page 14



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Subadult Leopard Tortoise (*Geochelone pardalis*), a beautiful and relatively common tortoise from Africa. Photo by the author.

Keeping Leopard Tortoises in Southern Arizona (*Geochelone pardalis*)

by Richard Fife

The leopard tortoise, *Geochelone pardalis*, is one of Africa's largest and most beautiful tortoise species. It has a high domed shell marked with yellows, browns, and black against a bone colored background. It is reported to grow to 26 inches (66 cm) and attain a weight of 105 pounds (48 kg) (Pritchard, 1979). I have observed that leopard tortoises are sexually mature at about 13 inches (33 cm), which in captivity is reached in about five to seven years.

The leopard tortoise is usually divided into two subspecies, *Geochelone pardalis pardalis*, and *Geochelone pardalis babcocki*. Greig and Burdett (1976) suggest, however that the subspecies

may not be valid. *G. pardalis pardalis* is less domed or flatter than *G. pardalis babcocki*. It is found in a small area of Namibia (South-West Africa) near Luderitz, Ketmanshoop, and possibly as far north as Rehoboth (Ernst & Barbour, 1989). *G. pardalis babcocki* is found in the southern part of Sudan, through Ethiopia, Kenya, Tanzania, Malawi, the southern border of Angola, Botswana, Namibia, South Africa.

According to Ernst and Barbour (1989), "These tortoises shun heavily forested areas, but inhabit savannas, plains, and kopjes with dry woodland, thorn scrub, and grasslands . . ." As suggested by Iverson's 1986 distribu-

tion dot map for the leopard tortoise, this species appears to be absent from hot desert regions, tropical rain forests, and areas of South Africa with severe frosts. Pritchard (1979) states that the leopard tortoise is found at elevations over 6,000 feet in the Graaff-Reinet area of South Africa. It is interesting to note that *G. pardalis pardalis* has been reported from the Namib Desert which is one of the world's unique fog deserts.

Over the years, many thousands of these tortoises were exported from Africa. Unfortunately, most failed to survive due to stress, disease, parasites, and improper care. In recent years, captive hatched animals have become



During extreme heat, Leopard Tortoises will seek shelter beneath dense vegetation. Photo by the author.



Adult Leopard Tortoises may be kept communally in a outdoor pen setting. Photo by the author.

Keeping Leopard Tortoises in Southern Arizona *continued*

available and have had a much better survival rate.

Most of the wild-caught leopard tortoises in this country were imported from Kenya and Tanzania where winters (June, July, and August) are warm and sunny. Winter temperatures rarely drop below 50 F (10 C) and days warm to 85 F (29 C). Summer months (November, December, and January) bring rain and air temperatures of 60 to 95 F (15.5 C to 35 C) (Rudloff, 1981).

In the southern part of the leopard tortoise's range, winter (June, July, and August) temperatures are similar to the winters of southern Arizona, and southern California including occasional frost. There is however, one very important difference between the climate of South Africa, and Arizona and California. In all but the extreme southwestern region of South Africa winters are dry and sunny. Solar radiation is important if these tortoises are to survive cool temperatures. Cold and rainy conditions cannot be tolerated.

My home is located in Phoenix, Arizona. I maintain 2.3 adult *Geochelone pardalis babcocki* that were wild caught in Kenya as large juveniles and subadults. They were exported in 1981 and 1984. During the past several years they have also produced offspring which I am also raising. In addition to this Kenya stock, I also have 1.2 juvenile Leopard Tortoises of South African origin.

The adult tortoises are confined in an outdoor pen which is surrounded by a six-foot fence. The top four feet is chain link and the bottom two feet

is plywood. The plywood is buried four inches into the ground. I have found, that a solid barrier reduces animal pacing, retains hatchlings from undiscovered nests, and eliminates tortoises from breaking their beaks or tearing their necks on the chain link. The enclosure measures 32 feet by 12 feet.

The substrate is native desert soil which is high in clay. The enclosure is planted with bermuda grass, rye grass, fountain grass, palms, spineless prickly pear cactus, and giant reed. The fountain grass (*Pennisetum*) is especially important, as the tortoises burrow in the grass, which insulates them from Phoenix's extreme summer heat (115 F) and cool nights.

In Phoenix, winter nights can be cold (25 - 30 degrees) and several overcast and rainy days can be expected. For this reason, I have provided an insulated barn which measures three feet tall, three feet from front to back, and four feet wide. It has a heavy fabric door and has been equipped with a thermostatically controlled, 250 watt infrared heat lamp which turns on when air temperatures drop below 65 degrees F (18 C). My tortoises emerge from their barn on winter mornings when the outside air temperature is above 50 F (10 C). The tortoises orient their shells toward the sun to maximize the amount of solar radiation received thereby maintaining a body temperature well above the air temperature.

The adult tortoises have grass available for grazing which is an important part of their diet. They are also fed alfalfa hay, spineless prickly pear cactus, squash, carrots, other

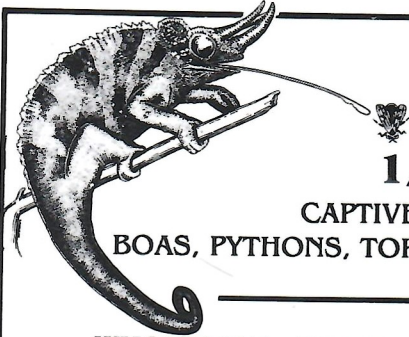
assorted vegetables, and occasionally fruit. Water is provided several times a week (every day in mid-summer) by flooding part of their yard with a few inches of water.

The sex of the leopard tortoise can be determined by the concavity of the plastron and larger tail in males. Another determining factor is the configuration of the anal scutes. In males, the anal scutes are more elongated and have a wide angle of separation. In females, the anal scutes are less elongated and are directed toward the rear of the shell. This difference can be seen in some neonates.

Mating and courtship can be observed all year. Nesting takes place from September through April. Each year, a female will lay three to five clutches of 14 to 21 eggs, with oviposition occurring at 30 to 60 day intervals. Nest excavation begins in the late afternoon and is completed after dark. Quite often a heat lamp and wind block is set up to enable the tortoise to maintain body temperature while nesting.

The tortoise eggs are immediately removed from the nest. The eggs are partially buried in moist commercial potting soil within a plastic shoe box. The box of eggs is placed in an incubator. I have found the ideal incubation temperature to be 81 to 83 F (27 - 28 C). At this temperature, eggs hatch in 120 to 140 days. At temperatures above 88 F (31 C), I find deformities and fully developed but dead embryos. At lower temperatures, incubation has taken up to 330 days. Eggs from a single nest will hatch over a ten to twenty day period. The eggs do not normally hatch on the same day. To date over 300 tortoises have been hatched at my facility.

Hatchling tortoises are maintained in 10 gallon (40 l) terraria and are bedded on alfalfa hay with the stems removed. The hatchlings are lighted by a row of four-foot, 40 watt Vita-Lite® tubes made by Duro-Test (North Bergen, NJ), and a row of four-foot 350 Blacklight F40/350BL® tubes manufactured by Sylvania (GTE Products Corp., St. Marys, PA). These are situated 18 inches (46 cm) above the tortoises. A cereal box is laid on its



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Keeping Leopard Tortoises in Southern Arizona *continued*

side to serve as a hide box. The terraria are maintained at 82 F (28 C).

The hatchling tortoises are fed almost exclusively moistened Zu/Preen Primate Diet®, (Hill's Pet Products, Topeka, KS). A diet of high-protein dog chow should be avoided. The neonates occasionally pick alfalfa leaves and flowers from their bedding. The tortoises are misted daily, and watered twice a week by placing them in a shallow tray of lukewarm water. Most of the tortoise's water intake comes from the water in the moistened primate diet.

Hatchling tortoises cannot survive the high temperatures or dry condi-

tions of Phoenix and cannot be maintained outside, on a regular basis, until they are at least four inches (10 cm) in straight line shell length. When the tortoises are four to six inches (10 - 15 cm), they are moved to outside pens. The primate diet is gradually withheld and the tortoises are acclimated to grazing conditions. Tortoises which hatched four to five years ago are just now becoming sexually mature.

I have found that the leopard tortoise is a very rewarding species to work with, and captive propagation will assure their continued availability to the serious collector. ☺

Literature Cited

Rudloff, W. 1981. World Climates, with Tables of Climatic data and practical suggestions. Wissenschaftliche Verlagsgesellschaft mbh, Stuttgart, Germany.

Pritchard, Dr. P.C.H. 1979. Encyclopedia of Turtles. T.F.H. Pub., Neptune, New Jersey. 895 pp.

Iverson, J. B. 1986. A Checklist with Distribution Maps of the Turtles of the World. Earlham College, Richmond, IN 47374.

Climate Charts (Rudloff, 1981)

Tanzania

Tabora

Temperature

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
high	88(31)	88(31)	88(31)	86(30)	86(30)	84(29)	86(30)	90(32)	91(33)	93(34)	93(34)	90(32)	93(34)
low	59(15)	61(16)	61(16)	61(16)	57(14)	54(12)	55(13)	57(14)	61(16)	63(17)	63(17)	61(16)	54(12)
precip	5.3(135)	5.0(126)	6.7(170)	5.2(133)	1.3(34)	0.1(3)	0(0)	0.0(1)	0.2(5)	0.6(14)	3.2(81)	7.1(181)	34.7(882)

Zimbabwe

Salisbury

Temperature

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
high	84(29)	84(29)	82(28)	82(28)	81(27)	75(24)	79(26)	81(27)	88(31)	90(32)	90(32)	86(30)	86(30)
low	55(13)	54(12)	52(11)	48(9)	41(5)	37(3)	36(2)	37(3)	43(6)	50(10)	54(12)	54(12)	(2)
precip	8.5(216)	6.7(172)	3.9(99)	1.4(36)	0.4(11)	0.2(4)	0.0(1)	0.1(3)	0.2(5)	1.2(30)	3.4(100)	7.3(186)	34.0(863)

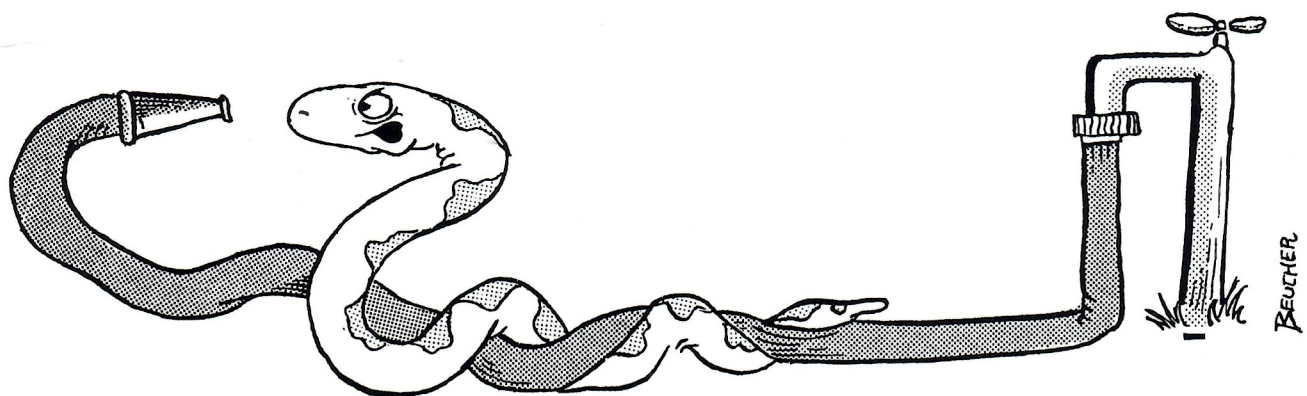
South Africa

Bloemfontein

Temperature

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
high	95(35)	90(32)	88(31)	82(28)	75(24)	70(21)	70(21)	77(25)	84(29)	91(33)	91(33)	94(34)	97(36)
low 50(10)	48(9)	45(7)	36(2)	28(-2)	24(-4)	23(-5)	24(-4)	28(-2)	37(3)	43(6)	45(7)	21(-6)	
precip	3.3(83)	3.2(81)	3.0(76)	2.0(51)	0.9(22)	0.3(7)	0.4(10)	0.6(14)	0.8(19)	1.9(48)	2.7(68)	2.7(68)	21.5(547)

All measurements are monthly averages. Temperature given as degrees Fahrenheit (Celsius) and precipitation as inches (millimeters).



"Something just doesn't feel right".....

Metabolic Bone Disease in Captive Reptiles

by Douglas R. Mader, MS, DVM

Part II, Continued From Previous Issue

Metabolic bone disease follows no defined time frame. Onset of the first clinical signs varies depending on a number of factors. For instance, young, growing animals have a greater demand for dietary calcium in order to fulfill their calcium needs for the developing bones. Mature, oviparous females experience high losses of body calcium during egg production. Both of these groups of animals have a greater need for calcium in the diet than a non-reproductive adult.

The disease typically presents itself in one of two forms. An animal doesn't necessarily have to have both. In the acute form, the animal's symptoms are those reflecting low blood calcium levels. These are manifested as convulsions, bodily spasms or tremors. This form is commonly seen in gravid females or females which have just delivered a clutch of eggs. Without immediate medical attention, this can be life-threatening.

External symptoms of the chronic form of the disease correlate with the insidious physiological changes occurring within the animal's body. The body compensates for deficiency in serum calcium by mobilizing calcium from the bones. The bones most commonly affected are the long bones (legs or ribs), the mandible (lower jaw), the flat bone of the skull, and lastly, the bones of the spine (vertebrae) (Figure 3). This form of the disease is often associated with poor husbandry practices such as improper diets, lack of appropriated vitamin/mineral supplementation and insufficient exposure to ultraviolet light.

It is common to see turtles and lizards with soft, pliable shells and



Figure 3. Radiograph (x-ray) of a Green Iguana with severe NSHP. Note the tortuous curvature of the spine and severe twisting of the leg bones. In spite of these marked deformities, the owner was able to correct the animal's diet and save it from certain death. When re-examined one year later, the iguana was eating well and had put on measurable weight, although the severe skeletal deformities remained.

swollen or broken legs, respectively, as the first sign to the owner that something is wrong. In most cases, the owner cannot remember anything happening to their pet which would cause such a severe injury. The bones lose so much calcium that they become fragile and will break or bend with even the slightest pressure. In severe conditions, the weight of the animal alone is enough to cause a fracture. In medical terms, this is called a "pathological fracture." The animals will often be paralyzed in the rear legs if the spine is involved. Lizards will sometimes walk with a "hopping" type

of gait instead of the more typical lateral motion.

When the jaw is affected, the calcium salts in the bones are replaced by a softer fibrous connective tissue (Fibrous Osteodystrophy). This results in a pliable lower jaw. The muscles of the tongue are so strong that they deform the lower jaw, thus resulting in a grotesque "smile" appearance. (Figure 4).



Figure 4. Fibrous osteodystrophy and NSHP in the jaw of an adult Green Iguana. The muscles of the tongue are so strong that they deform the weakened lower jaw, resulting in the grotesque "smile" appearance commonly seen in animals suffering from this metabolic bone disease.

If symptoms of NSHP develop in an animal, it should be taken immediately to a veterinarian for proper care. Initial treatment for NSHP consists of correcting any dietary imbalances and husbandry problems in mild cases. Injections of liquid calcium preparations may be necessary to combat any immediate life-threatening hypocalcemia in the acute cases. The calcium treatment can be very dangerous if not performed properly. If given too rapidly, the calcium can kill the patient on the spot.

Other treatments include injections of vitamin D3 and supportive care for any injuries which exist. If the animal can be managed past this critical period, then oral calcium and vitamin

Metabolic Bone Disease in Captive Reptiles *continued*

supplements can be given to replace the injectable forms. Your veterinarian will be able to advise you on the best possible aftercare.

If fractures are present then these will need to be treated. Remember, however, that an animal which is hypocalcemic will have difficulty healing. The diet must be corrected and the appropriate vitamins and minerals must be given, or the healing process may be prolonged or even inhibited (Figure 5).



Figure 5. Two radiographs of an adult tegu (*Tupinambis* sp.) which had been fed a long-term diet consisting only of raw egg. An intramedullary pin was placed in the thigh bone as an attempt to treat a femoral fracture (left). Two months later (right) the bone lacked density (as evidenced by the general graying of the bones and additional fractures in the animal's toes. Even though the owner sought medical attention for the broken leg, the initial severity of the animal's condition and the subsequent lack of appropriate diet led to a prolonged and complicated convalescence. Photo by the author.

It is not uncommon for the owner to try to hurry up the pace of recovery by over supplementation of the hitherto deficient nutrients. Care must be taken to prevent over supplementation of vitamin D3 and calcium to the convalescing animals. There have been reports of iguanas being fed dog food, which had been supplemented with high levels of calcium and exogenous vitamin D3, developing calcified blood vessels and mineralization of the muscles, kidneys and liver. This will only happen if the supplementation is dietary. If the animal is allowed to synthesize its own vitamin D3 by providing it with the proper exposure to ultraviolet light, its body produces only enough vitamin D3 to meet its needs and not to excess.

The owners needs to review their management and husbandry tech-

Table 1 - Food items commonly fed to captive reptiles

(The following list is a composite from values found in Denardo, Fowler and Jackson et. al.)

Food Item	Calcium: Phosphorus ratio	Value
Alfalfa	5.55:1	HIGH
Watercress	4.27:1	HIGH
Broccoli tops	2.96:1	HIGH
Carrots (boiled)	2.21:1	GOOD
Orange (peeled)	2.07:1	GOOD
Raw Bone Meal (calcium supplement)	2.10:1	GOOD
Vionate (vitamin/mineral suppl.)	2.00:1	GOOD
Dicalcium Phosphate (Mineral Suppl.)	2.00:1	GOOD
Raisins (dried)	1.85:1	GOOD
Spinach	1.82:1	GOOD*
Chicks (day-old)	1.40:1	GOOD
Mice (adult)	1.38:1	GOOD
Earthworm	1.00:1	LOW
Cucumber	0.95:1	LOW
Grapes (white)	0.87:1	LOW
Lettuce	0.86:1	LOW
Tomato	0.62:1	LOW
Apple	0.42:1	LOW
Banana	0.24:1	LOW
Crickets	0.13:1	POOR
Mealworms	0.10:1	POOR
Wax Worms	0.08:1	POOR
Hamburger	0.06:1	POOR
Beef Liver	0.02:1	POOR

* Certain plants such as spinach, beet tops and rhubarb contain a compound called oxalates. Oxalates bind with calcium in the intestinal tract and form calcium oxalate, thus interfering with calcium absorption.

niques, specifically in regards to diets, caging, lighting, etc. If all is favorable for a reasonable recovery, then the animal needs to have physical therapy to aid in convalescence. Swimming is the excise of choice for lizards, snakes and turtles. If the metabolic bone disease is caught in its early stages and given appropriate care, the chances for recovery are good. ?

References

- Cooper, J.E. et al. 1985. Manual of exotic Pets. British Small Animal Veterinary Association. 186-192.
- Denardo, D. 1986. Calcium, phosphorus and vitamin D. Their functions and interrelations. Northern California Herpetological Society Newsletter. 5(2):2-5.
- Fowler, M.E. 1986. Zoo and Wild animal Medicine. W.B. Saunders.
- Frye, F.L. 1981. Biomedical and Surgical Aspects of Captive Reptile Husbandry. V.M. Publishing, Edwardsville, Kansas.
- Gehrmann, W.H. 1987. Ultraviolet irradiances of various lamps used in animal husbandry. Zoo Biology. 6:117-127.
- Hogan, L.S. 1987. Sunlight: the giver of life. Bird Talk. 59-60.
- Jackson, O.F. and J.E. Cooper. 1981. Nutritional diseases, pp. 409-428 (in) Diseases of Reptilia. Academic Press.
- Marcus, L.C. 1983. Veterinary Biology and Medicine of Captive Amphibians and Reptiles. W.B. Saunders Co. Philadelphia, Pennsylvania.
- Russo, E.A. Nutritional osteodystrophy in an Iguana. Avian/Exotic Practice.
- Shively, M.J. and K. Edwards. 1985. Pathological calcification in a green iguana. Avian/Exotic Practice. 2:32-33.
- Tytle, T. 1989. Calcium metabolism in the lizard genus *Phelsuma*. (a preliminary report) Unpublished.
- Wallach, J.D. 1971 Environmental and nutritional diseases of captive reptiles. JAVMA. 159(11):1632-1643.
- Wallach, J.D. and G. L. Hoff. 1982. Metabolic and Nutritional diseases of reptiles. pp 155-167 (in) Hoff, G.L. and J.W. Davis (eds) Noninfectious Diseases of Wildlife. Ames, Iowa. The Iowa State University Press.
- Wallach, J.D. and W.J. Boever. 1983. Reptiles and amphibians. pp 978-1047. (in) Diseases of Exotic Animals. W. b. Saunders Co., Philadelphia.

First World Congress of Herpetology *continued from page 7*

remarks with a "plea:"

"In our enthusiasm to pursue science, let us not forget the animals themselves, those organisms we know so well, and yes, love. Amphibians and reptilian species, proportionate to their numbers, are the most threatened and endangered of all vertebrate animals, and they are particularly sensitive to environmental change... We are on the brink of losing forever a significant fraction of the diversity that we are only beginning to comprehend. We will have partly failed in our work this week, if our deliberations do not lead to some positive steps in better protecting these organisms from extinction."

Information presented throughout the Congress documented global habitat destruction, ranging from burning the tropical rain forests to indiscriminate urban growth and industrial development. These conditions are threatening amphibians and reptiles not by the year, but literally by the second. Conservation of the world's resources in the 1990's and 21st century will take the same commitment of time and money and

intensity which the nations of the world have devoted to defense in the past century.

Dr. D.J.E. Ingram, Vice-chancellor of the University of Kent stated the situation graphically when he said that historians 200 years from now will describe our generation with "pure horror, "as the one which "plundered the planet mercilessly." He said the world as a whole is realizing we can't go on as we have. "Even the politicians are getting worried ... The world is waking up to the problems it has got."

The setting of the Congress engendered both feelings for the need to preserve the world's resources, and an acute awareness of man's impact on earth - both good and bad - throughout history.

The road from London to Dover, which runs through Canterbury, was first travelled by the Romans when they colonized "Brittania." The campus of the University of Kent is located on 300 acres of parkland overlooking Canterbury City, whose site was also settled by the Romans.

The view from the campus is dominated by the great Canterbury Cathe-

dral. Construction of the present building took place primarily in the tenth through twelfth centuries, though St. Augustine dedicated the first cathedral on the site in the year 613. St. Thomas A'Becket was murdered in the cathedral on December 29, 1170.

A person cannot spend a week in Canterbury, in the shadow of its Cathedral without experiencing a sensation of both the mortality and timelessness of life on earth.

This sensation caused a special feeling and awareness of land, life, and time, to spread, almost unconsciously, throughout the deliberations of the Congress. The concern of the delegates for conservation was reflected in their presence on ground which has

continued on page 30

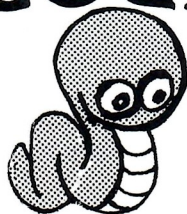
President's Message

continued from page 4

things that can enrich our lives. Not only that, we want to make sure that the potential for those experiences get perpetuated for future generations to come. I can still remember the day that I first saw a red-eyed tree frog *Agalychnis callidryas*. The experience was mind-boggling and became even more so when I observed this creature move about at night in a vivarium illuminated by a dim red light. It opened my eyes to a whole other world. As a teacher at the time, I thought all students should one day have the opportunity to experience something like this in their schools. Students should be allowed to care for animals in vivaria that simulate the essential aspects of their natural habitats and gain the subtle knowledge conveyed by interaction with beings from the natural world. Complex naturalistic vivaria should also be an integral part of schools in tropical countries. Caring for the vivarium in the classroom could become a key step in caring about the beings that make up our complex planet. Looking back, I can still remember when, as a student in a boarding school, I was first exposed to amphibians and reptiles. In my young mind, I was thinking "Fantastic, fantastic". I still feel that way today. ♪

Next Time-On Conservation and Importation
by Philippe de Vosjoli

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Small Rattlesnakes

Photographs by John H. Tashjian. Text by Vince Scheidt

Rattlesnakes have always held a very special place in the hearts of men. We as herpetoculturists admire their remarkable beauty and advanced biological features. We know that they are highly evolved and extremely well-adapted predators, found over a vast area of the Western Hemisphere. We marvel at their prey-gathering abilities and respect their venomousness. As captive specimens, we know that they are incredibly fascinating and seemingly-intelligent serpents. Because of our somewhat distorted perspective, however, it can be difficult to bear in mind that few animals can invoke greater terror or contempt in the average person as can rattlesnakes. Millions, perhaps billions, of human beings would wish to live in a world without rattlesnakes. After all, to these people, rattlesnakes are no more than repulsive, dangerous death machines, waiting for the opportunity to kill or maim them or their loved ones. Even many with a professed respect for other serpents will kill any rattlesnake on sight.

For this reason, we celebrate one group of these grossly misunderstood creatures; the small rattlers. At the very least, perhaps *these* little serpents can be appreciated. After all, the bigger the rattlesnake, the more the they are hated by the vast multitudes. Many of these diminutive creatures are extremely rare in captivity, endangered in their diminishing habitats, and worthy of reproduction and study in captivity. Unfortunately, few of the really rare ones are.

1 *Crotalus polystictus* Cope, 1859 - Mexican Lance-headed Rattlesnake

Range: The Mexican lance-headed rattlesnake occurs on the tableland of central Mexico from southern Zacatecas all the way across the country to central Veracruz.

Size: This species reaches a maximum length of up to about 37 inches (93 cm).

Habitat: Mexican lance-headed rattlesnakes reside in the open, rocky grassland habitat where small creeks abound. They may also reside in adjacent areas of pine-oak forest, although they appear

to prefer the flat, open, tall grass fields of the Mexican plateau.

Comments: This taxa has reproduced many times in captivity, producing litters of from 5 to 12 live young. Its habitat is rapidly being converted to agriculture in central Mexico, and this beautiful species may eventually become endangered in the wild. Lance-headed rattlesnakes are considered by many to be one of the most beautiful of all serpents.

2 *Crotalus enyo furrus* Lowe and Norris, 1954 - Rosario Rattlesnake

Range: The Rosario rattlesnake occurs from about San Telmo south to El Rosario on the Baja California peninsula of Mexico.

Size: This species reaches a maximum length of up to about 36 inches (91 cm).

Habitat: Rosario rattlesnakes occupy the San Quintin Plain of Baja California Norte. Vegetation here consists primarily of an open, xeric, coastal habitat. Snakes have been found in washes and on rocky hillsides. They appear to be fully nocturnal, at least during the hot summer months.

Comments: This race is doubtfully distinct from the nominant form, *C. e. enyo*. At the time it was described, no specimens were known from the roughly 100 mile area between the San Quintin Plain and areas occupied by the Lower California rattlesnake *C. e. enyo*. Rosario rattlesnakes are easy to maintain in captivity and they have been propagated a number of times.

3 *Sistrurus miliaris streckeri* Gloyd, 1935 - Western Pigmy Rattlesnake

Range: The western pigmy rattlesnake occurs from southern Missouri and eastern Oklahoma south to the Gulf of Mexico, and eastward into western Tennessee and southwestern Kentucky.

Size: This species reaches a maximum length of up to about 25 inches (64 cm).

Habitat: Western pigmy rattlesnakes occupy wet prairies, the edges of marshes, swamps and river floodplains where they feed on mice, frogs, snakes, and lizards.

Comments: Western pigmy rattlesnakes

are not commonly kept in captivity. This is probably a function of their relative commonness, high degree of irritability, and lack of bright or showy colors.

4 *Crotalus pricei miquihuanus* Gloyd, 1940 - Eastern Twin-spotted Rattlesnake

Range: The eastern twin-spotted rattlesnake occurs from southeastern Coahuila to southwestern Nuevo Leon in the Sierra Madre Oriental of eastern Mexico.

Size: This species reaches a maximum length of up to about 26 inches (66 cm).

Habitat: Eastern twin-spotted rattlesnakes occupy xeric pinon pine/agave-covered slopes of the Sierra Madre Oriental. This race is disjunct by several hundred miles from the more familiar nominate form, *C. p. pricei*.

Comments: *C. p. miquihuanus* seems to have responded to deforestation of its mountain habitat by increasing in numbers, perhaps as a result of opening of the of the vegetation and the subsequent increase in prey availability. Little is known of the biology of this interesting form, particularly in light of the available information about *C. p. pricei*.

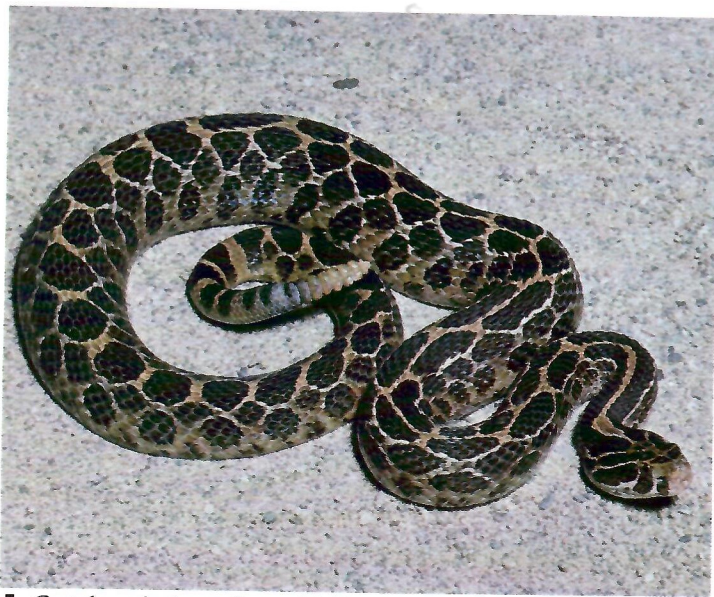
5 *Crotalus tigris* Kennicott, 1859 - Tiger Rattlesnake

Range: The tiger rattlesnake has a limited distribution. It occurs from south-central Arizona in the United States to near the southern border of the Mexican state of Sonora.

Size: This species reaches a maximum length of up to about 36 inches (91 cm).

Habitat: Tiger rattlesnakes occupy areas of creosote bush scrub on rocky foothills within the Sonoran Desert. They range from sea level to about 6000 feet.

Comments: This unusual species is characterized by the presence of a large rattle and seemingly small head. It is taxonomically allied with *C. mitchelli*, the speckled rattlesnake. Tiger rattlesnakes do well in captivity, and have been reproduced a number of times. Many are docile, and rarely strike, although a few specimens respond aggressively to the slightest provocation.



1 *Crotalus polystictus* Cope, 1859 - Mexican Lance-headed Rattlesnake



2 *Crotalus enyo furrus* Lowe and Norris, 1954 - Rosario Rattlesnake



3 *Sistrurus miliaris streckeri* Gloyd, 1935 - Western Pigmy Rattlesnake



4 *Crotalus pricei miquibuanus* Gloyd, 1940 - Eastern Twin-spotted Rattlesnake



5 *Crotalus tigris* Kennicott, 1859 - Tiger Rattlesnake



6 *Crotalus willardi amabilis* Anderson, 1962 - Del Nido Ridge-nosed Rattlesnake

S Rattle

Photos by
Text by



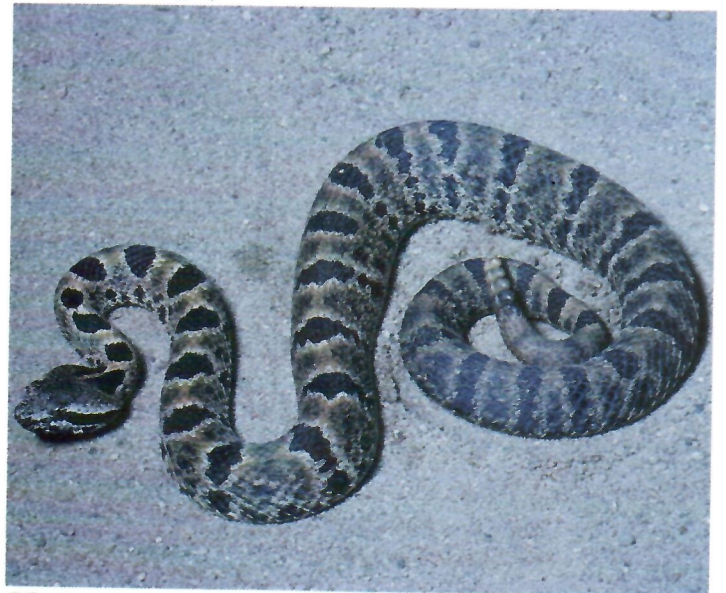
7 *Crotalus transversus* Taylor, 1944 - Cross-banded Mountain or Tres Cambres Rattlesnake



8 *Sistrurus ravidus exiguus* Campbell and Armstrong, 1979 - Guerrerana Pigmy rattlesnake



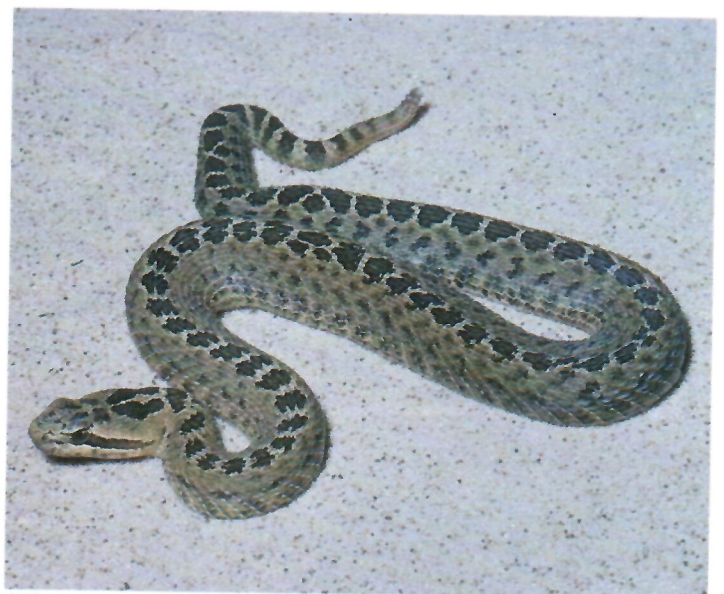
9 *Sistrurus miliaris miliaris* Linne, 1766 - Carolina Pigmy Rattlesnake



10 *Crotalus lepidus morulus* Klauber, 1952 - Tamaulipan Rock Rattlesnake



11 *Crotalus cerastes laterorepens* Klauber, 1944 - Colorado Desert Sidewinder



12 *Crotalus triseriatus triseriatus* Wagler, 1830 - Central Plateau Dusky Rattlesnake

VIVARIUM

6 *Crotalus willardi amabilis* Anderson, 1962
- Del Nido Ridge-nosed Rattlesnake

Range: The Del Nido ridge-nosed rattlesnake is a very rare serpent apparently restricted to the Sierra del Nido in north-central Chihuahua, Mexico.

Size: This form reaches a maximum length of up to about 25 inches (64 cm).

Habitat: Del Nido ridge-nosed rattlesnakes occupy pine-oak forest in sympatry with *C. p. pricei* and *C. l. klauberi*, much like the related *C. w. willardi* in adjacent Sonora and in the United States.

Comments: Little is known of the biology of this rare rattlesnake. Its range is very limited, and constantly under deforestation pressures, although the snakes seem to tolerate this habitat degradation.

7 *Crotalus transversus* Taylor, 1944 - Cross-banded Mountain or Tres Cambrés Rattlesnake

Range: The cross-banded mountain rattlesnake occurs in central Mexico in northwestern Morelos, in Distrito Federal, and in the state of Mexico.

Size: This species reaches a maximum length of up to about 19 inches (50 cm).

Habitat: Cross-banded mountain rattlesnakes occupy temperate boreal forests at about 9000 feet. They appear to prefer south-facing slopes, and seem to be adapted to a montane environment that we know little about.

Comments: This diminutive species has proven difficult to maintain in captivity. This could be because of difficulty in reproducing their specific (unknown) environmental requirements in captivity. Captive specimens appear to be very inoffensive, rarely, if ever rattling or striking. Because of this tendency to not rattle, they may be much more abundant than suspected, as their cryptic coloration makes them difficult to spot in the field. This species clearly warrants study in captivity.

8 *Sistrurus ravus exiguus* Campbell and Armstrong, 1979 - Guerreran Pigmy rattlesnake

Range: The Guerreran pigmy rattlesnake occurs in the Sierra Madre del Sur in the Mexican State of Guerrero.

Size: This species reaches a maximum length of up to about 26 inches (66 cm).

Habitat: *Sistrurus ravus exiguus* is found in floodplains overgrown with thick brush. These floodplains are flanked by hillsides supporting a pine-oak forest.

Comments: The Guerreran pigmy rattlesnake, being relatively heavy-bodied, may avoid competition with three other crotaline snakes of similar length by remaining in the flat floodplain areas,

whereas the others tend to be slope dwellers. Field observations suggest that they are diurnal foragers, preying principally on rodents.

9 *Sistrurus miliaris miliaris* Linne, 1766 - Carolina Pigmy Rattlesnake

Range: The Carolina pigmy rattlesnake ranges from east-central North Carolina south to southern South Carolina and west through central Georgia and Alabama to extreme eastern Arkansas.

Size: This species reaches a maximum length of up to about 25 inches (64 cm).

Habitat: Carolina pigmy rattlesnakes occupy the longleaf pine-scrub oak flatwoods and loblolly flatwoods forests of the Atlantic Coastal Plain.

Comments: Carolina Pigmy Rattlesnakes vary somewhat in background color from location to location. The specimen illustrated is from near the race's northeastern distribution limit, in Hyde County, North Carolina, an area known for its reddish pigmies; this is a sought-after color variant. This species does well in captivity, and propagates easily.

10 *Crotalus lepidus morulus* Klauber, 1952 - Tamaulipan Rock Rattlesnake

Range: The Tamaulipan rock rattlesnake occurs in the mountains of south-central Tamaulipas, Mexico.

Size: This species reaches a maximum length of up to about 33 inches (84 cm).

Habitat: Tamaulipan rock rattlesnakes appear to be abundant on rocky hillsides dominated by pines, oaks, and fir trees, with agave and other stem succulents on drier, south-facing hillsides. This snake has been collected at elevations between about 3500 feet and 7000 feet.

Comments: The original specimens of this taxon were collected by P.S. Martin, who had found them in the Gomez Frias area of southern Tamaulipas. The terrain where this race occurs is extremely rugged, and access is severely limited. Only a handful of specimens of this colorful subspecies of *C. lepidus* are currently being kept in captivity.

11 *Crotalus cerastes laterorepens* Klauber, 1944 - Colorado Desert Sidewinder

Range: The Colorado Desert sidewinder occurs in desert areas of central and eastern Riverside County, eastern San Diego County, and throughout Imperial County, California and east to western Yuma County in Arizona. It also occurs in northeastern Baja California and in extreme northwestern Sonora, Mexico.

Size: This species reaches a maximum length of up to about 33 inches (84 cm),

although most adults are smaller.

Habitat: Colorado Desert sidewinders occupy open desert habitat, typically in areas of fine, wind-blown sand where there are rodent burrows. They can also occur on rocky slopes or on barren desert hardpan. As an adaption to sandy habitat, they can "sidewind" across loose terrain or slippery surfaces.

Comments: The Colorado Desert sidewinder can be differentiated from the conspecific Mojave Desert sidewinder (*C. c. cerastes*) and Sonoran Desert sidewinder (*C. c. cerobombus*) by the presence of 23 scale rows at mid-body. The Mojave and Sonoran Desert subspecies both typically have 21 scale rows. Otherwise, these three taxa are rather similar in behavior, coloration, and morphology.

12 *Crotalus triseriatus triseriatus* Wagler, 1830 - Central Plateau Dusky Rattlesnake

Range: The Central Plateau dusky rattlesnake occurs in the high mountains of central Mexico from Nayarit across the country to west-central Veracruz.

Size: This species reaches a maximum length of up to about 27 inches (68 cm).

Habitat: Central Plateau dusky rattlesnakes occupy mountain slopes near streams where dense bunch grasses and rocky outcrops abound. They can also be found near talus slopes and in pine-oak forests.

Comments: This race has been found higher in the mountains than any other species of *Crotalus*. Specimens have been secured at above 13,000 feet. It appears to be more abundant at between 5000 and 9000 feet. Because of the high elevations at which this mountain snake occurs, it is almost totally diurnal.

Suggestions For Further Reading

Armstrong, B.L. and J.B. Murphy. 1979. The Natural History of Mexican Rattlesnakes. Mus. Nat. Hist., U. Kansas Special Pub. #5. 88p.

Campbell, J.A. and B.L. Armstrong. 1979. Geographic variation in the Mexican pygmy rattlesnake, *Sistrurus ravus*, with the description of a new subspecies. Herpetologica 35(4): 304-317.

Gloyd, H.K. 1940. The Rattlesnakes, Genera *Sistrurus* and *Crotalus*. Chicago Acad. Sciences., Special Pub. #4. 266p.

Klauber, L.M. 1972. Rattlesnakes. U. California Press, Berkeley. 2 vol., 1533p.

Murphy, J.B. and B.L. Armstrong. 1978. Maintenance of Rattlesnakes in Captivity. Mus. Nat. Hist., U. Kansas Special Pub. #3. 40p.

Serpentia

Rana take heed, and Hylidae,
Rodentia, and warty Bufonidae;
For when your lair's most trustable,
And your hunkered where you want t'be,
The stalker: jaws adjustable,
Turns you cuisine,
Nouvelle and, Degustable.

You've unlikely ambulation:
Undulation
And renewable complexion of
scutellation;

Few creatures, then, with less appeal
The icky worm, the slimy eel;
Can claim as their norm
your singular form:
Elongation.

Alas! by life fossorial,
you're left but a single lung;
and that secreted, ancient, nuptial trait,
Kept unsung until of late:
To use you put twice the penises,
Leaving one lunged ophidian venuses,
Breathless and, Unstrung

But for this hidden dimorphism,
Unsheathed in affairs of heart,
It is practically impossible
To tell you two apart.

Your well horned nose no scent doth tell,
Upon forked tongue do odors smell.
Is is upon your tongues retraction,
That tasted smells are put to action.

The Darwinians claim that
you became feathery;
Your scales turned quills and eggs,
From ovum leathery,
That tiny neonates toothy slit,
Sooner or later, in a
decomposing incubator.

I've chosen carefully to refrain
From mention of your common name,
Speaking of which makes
somniaulists wake
And good Eve, paradise to forsake,
(This you may trust, or find it spurious).
Neither the timid nor piqued
can e'r decide,
Their eyes you to oggle, or
the same to hide,
And even those who you leave just furious
Are never, never, left uncurious.

► *Stuart Shedletsky*
June 9, 1988

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The Hardy and Prolific Sand Boa, *Eryx jaculus jaculus*.

by Steven Simpson and Angela Ellis

The spotted sand boa, *Eryx jaculus*, is known by a variety of common names including European sand boa, western sand boa, javelin sand boa, palaearctic sand boa and steppe boa. This taxon is divided into three subspecies by most systematists.

The European form, *Eryx jaculus turcicus*, can be found in southern Yugoslavia, Albania, Greece and The Cyclades, southern Bulgaria and east through Turkey. It may also occur in northern Syria.

The eastern form, *Eryx jaculus familiaris*, has a smaller range. It is restricted to Turkey east from Ankara, to northwestern Iran, the Soviet republics of Armenia and Gruzia and the northern Caucasus.

The nominate form, *Eryx jaculus jaculus*, is a widely distributed snake, being common throughout its range. It has been recorded from Turkey, Syria, Iraq, Iran, the southeastern Soviet Union, Lebanon, Israel, northern Saudi Arabia, Egypt, Libya, Tunisia and Algeria. Although noted from the fossil record in Morocco (Rage 1976), recent confirmed reports of its current presence there are lacking (Le Berre 1989).

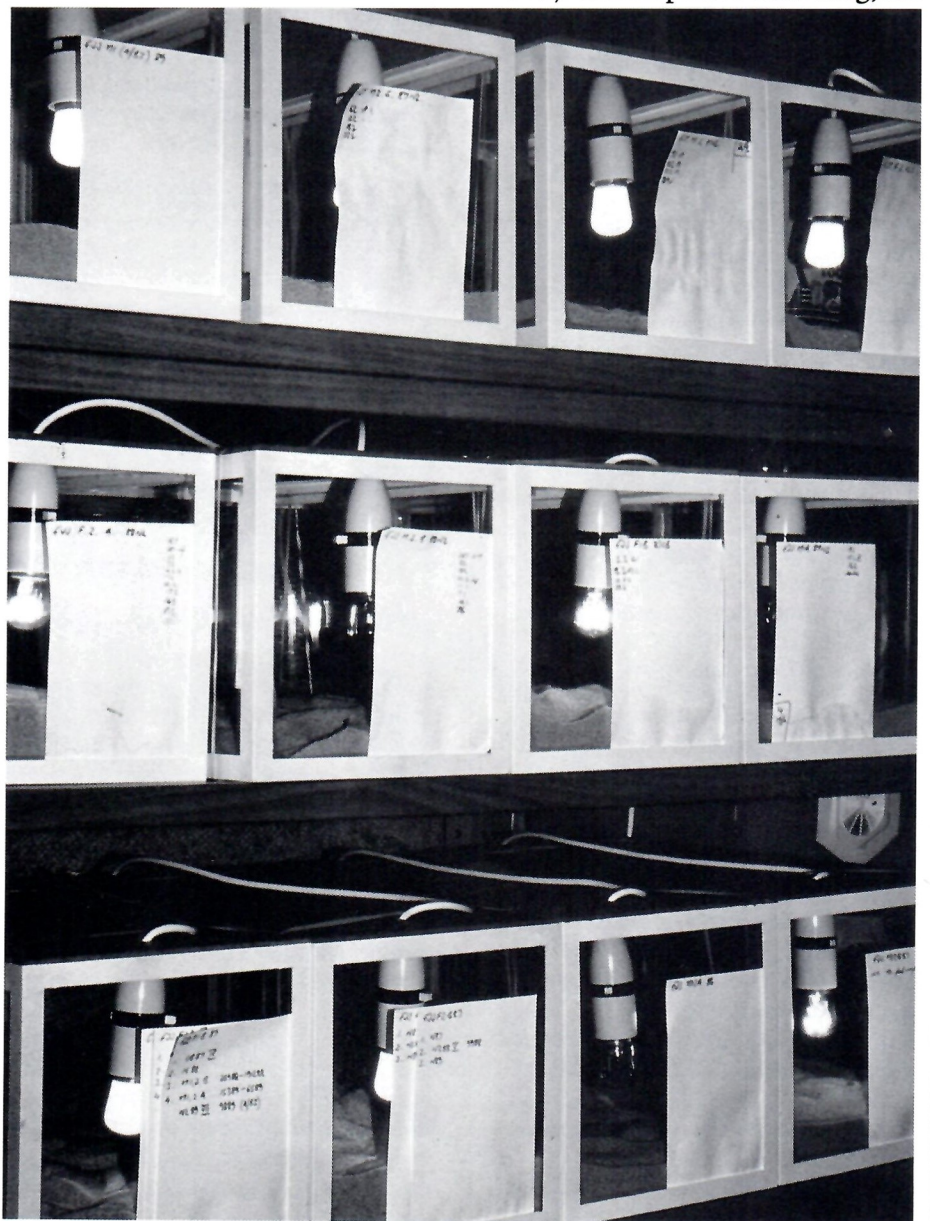
Distinguishing the subspecies can be difficult, even for the expert (Basoglu and Bilgin 1961). Specimens are most easily identified if the collecting locality is known. For example, if you have a spotted sand boa from Greece you will have *Eryx jaculus turcicus*; if you have one from Algeria, it will be *Eryx jaculus jaculus*. Basoglu and Baran (1980) provide a key to the subspecies.

Throughout its range, the spotted sand boa can be found in a variety of habitats, including beaches (Bellairs and Shute 1954). It is most commonly found on stony ground or clay steppe

without sand. These boas are fossorial (burrowing) and, although they often come out to bask in the morning, they are most active during the early evening and at night. It is interesting to note that movement is achieved by lateral undulation and not by the rectilinear locomotion common to

many larger boids. Predators include *Varanus griseus* (Le Berre 1989) and birds of prey (Etchecopar and Hue 1964).

Eryx jaculus jaculus is a small snake averaging 16 inches (40 cm) in length. The largest example recorded was 50 inches (127 cm) (Reed and Marx 1959). Well adapted to burrowing, this



The author's breeding setup. Photo by Steven Simpson.

The Hardy and Prolific Sand Boa *continued*

boid is a plump, cylindrical snake which feels flaccid when held. It has small, non-overlapping smooth scales on the front half of the body which become feebly keeled towards the tail. The head, which can hardly be differentiated from the neck and body, is also covered with small scales. There are no labial pits. The eye is small, has a vertical elliptical pupil and usually an orange iris. The ventral scales are narrower than the width of the body, a characteristic of the genus. The anal scale is entire. The tail is short, slightly prehensile, obtusely conical with the subcaudals in a single row. The upper jaw is longer than the lower jaw. The rostral scale (nasal ridge) is enlarged and thus well adapted to its fossorial lifestyle. Interestingly, the rostral shield is more shovel-shaped and keratinized in Adult *Eryx jaculus familiaris* and *Eryx jaculus turcicus* than it is in the nominate form, although reasons why this should be so are at present unclear (A.G. Kluge, pers. comm.). The vestigial hind-limbs appear as anal spurs in both sexes. Superficially similar to viperid snakes, with which they are occasionally sympatric, spotted sand boas can be easily distinguished by their smaller and narrower heads (S. Jones, pers. comm.).

As is to be expected with such a wide-ranging snake, *Eryx jaculus jaculus* exhibits considerable variation in color. The ground color is typically some shade of yellow or orange, but environmental color matching has been recorded with grey and green forms being noted in Iraq (Kalaf 1959) and in Libya (Schleich 1984). A striking specimen with a white ground color was collected in southwest Syria (Esterbauer 1985). Around the Caspian Sea, where predominantly alkaline soils occur, the sand boas are often completely brown (Mertens 1960). In southern Israel on sandstone formations, *Eryx jaculus jaculus* and other snakes such as *Echis colorata* (the saw-scaled viper) have a reddish ground color (E. Leibiech, pers. comm., Mendelssohn 1965). While the dorsal markings are typically brown, the venter can be a variety of colors from white or pale straw to bright orange. Brown speckling on the venter

may or may not be present, and such variation exists even within populations on a sub-regional level.

It is interesting to look back over the history of captive maintenance of this species. In fact, *Eryx jaculus* is of some interest to historians. In 1751, the Swedish naturalist Hasselquist received a snake which he described as *Anguis cerastes* believing it to be the horned viper we now know as *Cerastes cerastes*. The snake that he received was in fact a spotted sand boa to which someone had fixed artificial horns. The claws of some bird had been introduced to the head over the eyes (Anderson 1898).

First described to science by Hasselquist and Linnaeus, the spotted sand boa has long been kept as a vivarium animal. The earliest reference we have to its care is from two Austrian herpetologists, Professor Franz Werner and his colleague Professor Zander, who kept *Eryx jaculus* in the 1890's (Werner 1896).

Popularized in the 1950's and 1960's by the famous Czech herpetologist Zdenek Vogel, *Eryx jaculus* have been kept by such notable snake keepers as Hans Schweizer and Othmar Stemmler (Vogel 1963, 1968; Petzold 1982; Stemmler 1958).

From the early 1960's, a greater public interest in vivarium-keeping in England led to a rapid expansion of the activities of the live reptile trade. A quick review over the last 25-30 years shows that, until recently, *Eryx jaculus* has rarely been kept in England. However during the 1960's, *Eryx johnii* and *Eryx conicus* were often imported. During the 1970's and into the 1980's, *Eryx colubrinus* became widely available through the activities of a well-known African conservationist, and these are now probably the most popular and commonly bred sand boas. In late 1986, *Eryx jaculus jaculus* figured in shipments from Egypt; specimens from these shipments formed the basis of our breeding group.

Recent figures (R. Bold pers. comm.) show that in 1988, three trade licenses for the import into England of 250 *Eryx jaculus* and in 1989, eight trade licenses for the import of 634

specimens were issued by the Department of the Environment. Although not all of the animals licensed may have actually been imported, the figures give a good indication of the continued large-scale trading in live sand boas.

One of the first problems that any serious breeding project must keep in mind are the risks of hybridization and inbreeding. With spotted sand boas, it is essential to identify the subspecies that you are working with to avoid hybridization. Inbreeding can be avoided by having a large breeding group and keeping accurate recordings of matings and offspring.

Theoretically, one of the uses of captive breeding lies in the reproduction of animals for release into the wild. Although this is not applicable to such a common and widely distributed snake as *Eryx jaculus jaculus*, it may in the future be relevant to the European form, *Eryx jaculus turcicus*. A great deal of collecting, legal and otherwise, takes place on the Greek islands each year. It is thought that over-collecting by vivarists and tourists, together with continued urban development threatens the survival of *Eryx jaculus turcicus* in its natural habitat. Breeding groups of this snake were established in England, and captive bred offspring have since been introduced to the wild. I would stress that there is really no excuse to take *Eryx jaculus turcicus*, or indeed other snake species, from such island habitats for vivarium use, when they are already bred in captivity and are readily available at little or no cost to seriously interested and knowledgeable people.

To return to *Eryx jaculus jaculus*, it is not surprising that such a successful and widely-distributed snake, occurring under such widely differing climatic conditions, should be easily bred in captivity. Indeed, its small size and obvious adaptability make it a suitable candidate for the vivarium. Our initial pairs were obtained as wild caught adults in the winter of 1986/1987. They mated in the spring of 1987 and produced babies the same autumn.

Our snakes are kept in an environmentally-controlled snake room which receives no natural sunlight. The sand boas are kept either singly or in same

The Hardy and Prolific Sand Boa *continued*

sex pairs in small glass tanks 15 3/4 x 7 7/8 x 7 7/8 inches (40 x 20 x 20 cm) with a low wattage light bulb suspended at one end from a peg-board top. In nature, these snakes commonly have high population densities (S. Jones, pers. comm.), so there is no problem with keeping them in groups. In an intensive breeding effort such as ours, the cages are stacked. We use plastic-coated dexion shelving which is easily assembled and cleaned. The advantage of wide width shelving is that cages can be positioned to avoid overheating in summer and to allow for cooling in the winter.

Although rarely found in a sandy habitat, it has been our experience that spotted sand boas are most easily maintained in captivity on a substrate of fine dry silver sand. A depth of about 2 inches (5 cm) is adequate, allowing enough room for normal behavior and being a manageable quantity and weight for the keeper. No problems have been encountered with sand ingestion, even with babies. The fine sand particles pass readily through the digestive system of these snakes. Flat stones can be placed on the sand to give a more natural environment, but in our setups this is not feasible in terms of quick and easy maintenance.

Dry silver sand creates the low humidity environment favored by sand boas and works to the advantage of the keeper in that the snakes' waste products dry quickly. Through the activities of the snakes, the feces are deposited on the surface of the sand where they can be quickly and easily removed. Our sand boa cages are spot cleaned in this fashion at least once or twice per week. The tanks are emptied, scrubbed out and the sand replaced every three months and also following births. This keeps maintenance time and stress to the individual snakes to a minimum.

The snakes are kept under a specific temperature regime. Heating and lighting is provided by small, low wattage light bulbs, the wattage being varied according to the season. The lights are controlled by an automatic 24 hour timer. The light cycle is varied throughout the year with up to 14 hours daylight in the summer being

reduced to about 8 hours in the winter.

One important factor in the successful long-term maintenance of sand boas is providing a degree of climatic variation not only seasonally, but during each month, reflecting the degree of variation experienced in natural habitats. Cool and cloudy days can be simulated in the vivarium by using a day omitting time switch. Water is provided by twice weekly spraying the rear walls of the vivarium.

Feeding presents no problems with this species. The adults are fed on pre-killed rodents of various sizes at irregular intervals. It is our experience that the males prefer small mice. The females will usually eat anything offered, even small rats. Food items are presented in the late evening when the snakes are most active. The prey is swallowed following a lengthy examination. In the wild, these snakes have been documented eating a variety of prey, including lizards, birds and carrion (Gruber 1989, Bodenheimer 1935). Their flexibility in regards to food preferences may be a factor in accounting for their wide distribution. In the wild, they are undoubtedly of economic importance to man; with their high population densities, they consume large numbers of rodents each year. In confinement, they do not receive the same amount of exercise and are not subjected to the same pressures and stresses as they would in the wild. If overfed, the females soon develop fat deposits. Care should be taken to avoid overfeeding, as obese female snakes are known to have great difficulty passing young or infertile ova (V. Scheidt, pers. comm.). Shed-

ding typically takes place about every six weeks.

Our initial stock was quarantined before being introduced to our breeding facility. The stronglylid nematode, *Kalicephalus ersiliae*, has been recorded from *Eryx jaculus* (Baker 1987). No health problems have been experienced with our snakes.

Given proper management, *Eryx jaculus jaculus* is easy to breed in captivity. Visits to the snake room are kept to a minimum, especially during the breeding season. Our snakes are handled as little as possible, probably only four or five times per year. When handled, they exhibit behaviors characteristic of wild snakes; some will butt or strike, usually with the mouth closed. Only the occasional specimen will bite and invariably they will also discharge the contents of the cloaca.

The animals must be correctly sexed, introduced in the correct sequence and in the correct season. Sexing *Eryx jaculus jaculus* is extremely easy. The sexes are dimorphic. The females are considerably longer and more robust than the males. With a large enough sample for comparison, this is an easy way to differentiate adult snakes. Additionally, males have a longer and more narrowly tapering tail than females. This is apparent even in small juveniles and allows for 100 percent successful sex determination without the use of invasive procedures such as probing.

In the wild, reproduction in semi-desert reptiles is correlated to the availability of water and food. Under extreme climatic conditions, *Eryx jaculus jaculus* may not breed for many



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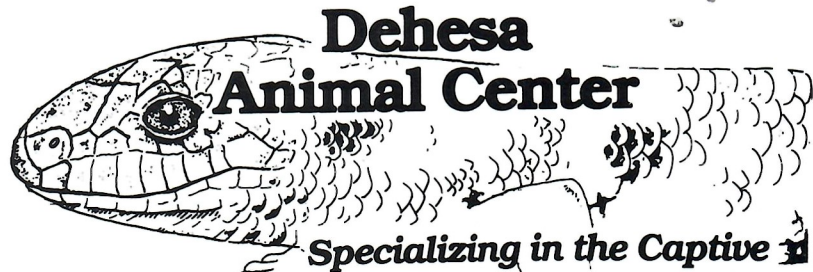
The Hardy and Prolific Sand Boa *continued*

years. Desert and semi-desert habitats are transformed by the falling of rain with many creatures completing their life cycles at this time. Under the more favorable conditions of captivity, it is not surprising that *Eryx jaculus jaculus* should breed regularly. We have had females produce litters two years in a row.

Successful breedings have been achieved using the following method. The sexes are kept separately for most of the year, the females being well fed prior to and immediately after a cool period usually between December and March. In late April and May, the females are introduced to the males. A ratio of one female to two males is used. The males exhibit competitive behavior. Courtship and mating usually take place within half an hour of introduction. We believe that reproductive behavior is enhanced by the use of more than one male; by introducing a female that has just shed her skin; by the use of confinement (i.e., using small cages); and by spraying the cages during the breeding season with tepid water. No tests were undertaken to prove these hypotheses; obviously, there are many variable factors at work here. With such a widely distributed species, parameters are variable, but these methods work well for us.

Males characteristically fast during the breeding season and occasionally have to be coaxed into resuming feeding after the females have been removed. On such occasions, we offer very small live mice. Based on observations of our captive specimens, we wonder if, in wild populations, a proportion of males perish after the breeding season as a result of their competitive exertions. Perhaps in the wild males engage in ritualistic competition over a female for a much shorter period of time.

In our set-ups, courtship and mating behavior take place for many hours each day and for weeks on end. After about six to eight weeks, the females are removed from the males and housed separately. During gestation the females often bask on the surface of the sand immediately under the light/heat source and feeding typically continues until about two weeks



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before birth. The babies are born in late August and early September, and births have been recorded at different times of the day. Litters range from five to ten young. A litter of fourteen has been recorded for *Eryx jaculus turcicus*. Our litters have usually had slightly more females than males. The neonates are brighter in color than the adults.

The only problem that we have encountered with any of the births was the retention of an infertile ovum by a parturient female.

The babies are removed from the mother's cage as soon as they are discovered and are housed in small, well-ventilated opaque plastic containers with a substrate of dry silver sand. These containers are placed in a standard, wood-construction, glass-fronted vivarium in which heating and lighting are provided by a 60 watt light bulb connected through a dimmer switch to an automatic 24 hour timer. A photoperiod of 14 hours light to 8 hours dark and an ambient daytime temperature of about 86 F (30 C) are maintained. The containers are disturbed as little as possible. They are positioned around and on the same level as the light/heat source to allow for maximum irradiation of the substrate.

The babies shed their skins within a few days of birth and are offered newly born live pink mice which are typically readily taken. The occasional individual that refuses live food will usually accept dead pinkies. Very occasionally, babies will overwinter without feeding and will commence feeding in the spring. Babies that do not feed voluntarily are not tube- or

force-fed. We have had one baby refuse all food from its birth in September to the following May, a period of eight months. Eventually, it fed voluntarily and is now doing well. In the wild *Eryx jaculus* and *Vipera ammodytes*, exhibit an ontogenetic shift in diet from lizards to small mammals (S. Jones, pers. comm.). Although no information is available on the survival of babies in natural populations, a high degree of success of rearing in captivity has been achieved in our sample group.

On the rare occasion that an individual refuses all food to the extent that it is obviously suffering, it is euthanased. This may seem unusual to those of you who have a commercial interest in breeding reptiles, but in this way healthy and viable captive populations are formed with the minimum of effort. In the long term, it is more desirable to have litters of self-starting offspring than to spend time artificially inducing feeding with all the stress to the animal that that entails.

Babies are fed weekly and growth is rapid. Under our captive conditions, sexual maturity is probably reached after two and a half years. We hope to have our first second generation litters later this year.

Where possible, surplus offspring are disposed of in unrelated pairs to genuinely interested parties who have a long term commitment to their care.

Bowler (1977) notes a wild caught adult *Eryx jaculus* still alive after 18 years and 4 months in captivity. It is quite possible that with careful husbandry, captive-bred *Eryx jaculus* could routinely live this long or even longer.

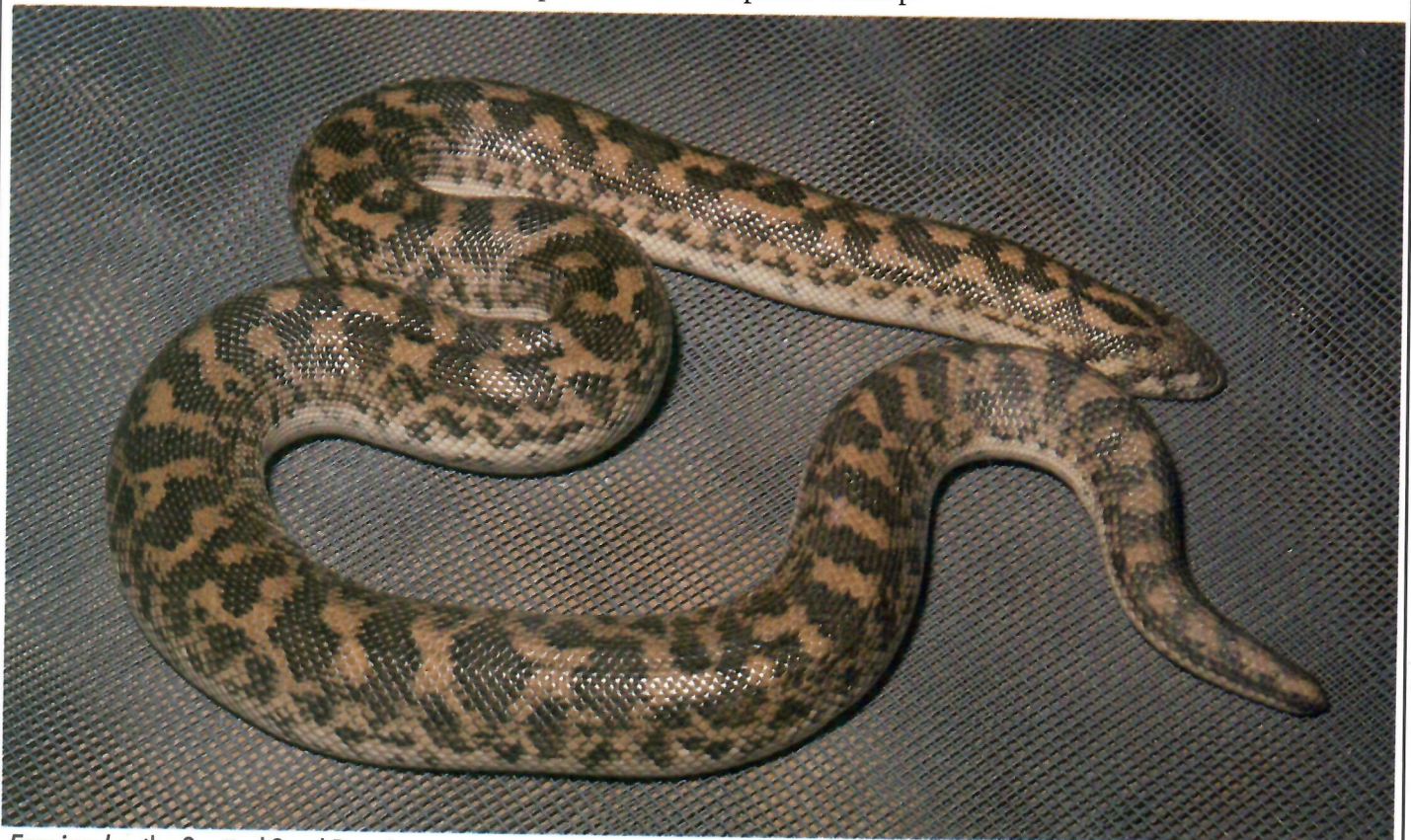
The Hardy and Prolific Sand Boa *continued*

Acknowledgements

We are grateful to Neil Chappell without whose assistance our breeding project would not be possible, and to R. Bold of the Endangered Species Branch at the Department of the Environment for the provision of recent wildlife trade statistics. Special thanks are due to our friend and colleague Scott Jones for the use of materials from an unpublished field report.

References

- Anderson, J. 1898. The Zoology of Egypt. Vol. 1. Reptilia and Batrachia. B. Quaritch, London. 371 pp.
- Baker, M.R. 1987. Synopsis of the Nematoda parasitic in amphibians and reptiles. Mem. Univ. Newfoundland Occ. Pap. Biol. No.11. 325 pp.
- Basoglu, M. & I. Baran. 1980. The Reptiles of Turkey. Part II. The Snakes. Ege Universitesi Matbaasi, Izmir. 205 pp.
- Basoglu, M. & I. Biglin. 1961. On some new specimens of sand-boa, *Eryx jaculus* L. from Izmir (Western Anatolia). Ann. Magg. Nat. Hist., London 13(4):557-558.
- Bellairs, A.d'A. & C.C.D. Shute. 1954. Notes on the herpetology of an Algerian beach. Copeia 3:224-226.
- Bodenheimer, F.S. 1935. Animal Life in Palestine - An introduction to the problems of animal ecology and zoogeography. Mayer, Jerusalem. 506 pp.
- Bowler, J.K. 1977. Longevity of Reptiles and Amphibians in North American Collections. SSAR Herp. Circular No.6. 32 pp.
- Esterbauer, H. 1985. Zur herpetofauna Sudwestsyriens. Herpetofauna 7(38):23-34.
- Etchecopar, R.D. & F. Hue. 1964. Les Oiseaux du Nord de l'Afrique de la Mer Rouge aux Canaries. Boubee, Paris. 606 pp.
- Gruber, U. 1989. Die Schlangen Europas und rund um das Mittelmeer. W.K., Stuttgart. 248 pp.
- Khalaf, K.T. 1959. Reptiles of Iraq with some notes on the amphibians. Ar-Rabitta, Baghdad. 96 pp.
- Le Berre, M. 1989. Faune du Sahara. Vol. 1 Poissons-Amphibins- Reptiles. Hatier, Paris. 332 pp.
- Mendelssohn, H. 1965. On the biology of the venomous snakes of Israel. Part 2. Israel J. Zool. 14:185-212.
- Mertens, R. 1960. The World of Amphibians and Reptiles. Harrap, London. 207 pp.
- Reed, C.A. & H. Marx. 1959. A herpetological collection from North-eastern Iraq. Trans. Kansas Acad. Sci. 62(1):91-122.
- Rage, J.-C. 1976. Les squamates du Miocene de Beni Mellal, Maroc. Geol. Medit. III(2):57-70.
- Schleich, H.-H. 1984. Studies on the Herpetology of the Kouf National Park and adjacent areas of Cyrenaika with a Checklist of the Amphibians and Reptiles of Libya. Unpubl. IUCN/ACSAD report. 110 pp.
- Stemmler, O. 1958. *Eryx jaculus turcicus* Olivier - die europaische Riesenschlange. Z. Vivaristik 4:89-100.
- Vogel, Z. undated. Reptile Life. Spring Books, London. 80 pp.
- Vogel, Z. 1963. Wunderwelt Terrarium. Urania, Leipzig. 228 pp.
- Vogel, Z. 1968. Riesenschlangen aus aller Welt. Ziemsen, Wittenburg. 100 pp.
- Werner, F. 1896. Zoologische Garten. XXXVII:80.



Eryx jaculus, the Spotted Sand Boa, is an easy species to maintain and breed in captivity. Photo by Vince Scheidt.



Agama stellio, the Hardun. Photo of specimen in the field by the author.

After the Tourists have gone (the Agamas come out to play)

by Kevin J. Hingley

Sitting upon the centuries-old stone foundation of a moderately well-preserved amphitheater on the outskirts of the popular tourist resort of Bodrum, southwestern Turkey, I waited for the sun to rise above the surrounding hillside. Soon the intense heat would warm the blocks of hand-hewn rock enough to encourage the resident Agamas, *Agama stellio*, to emerge from their overnight resting places so that I could at least take some half-decent photographs to show my fellow herpetologists back home. It was only 7:30 a.m. and about 80 F, plenty warm enough for me, and apparently also for the bus load of German tourists who had come to view this ancient place. I lit another cigarette and listened intently to an attractive, young nordic-looking lady telling her fellow countrymen (and women) the history of the amphitheater, until I realized it was something of a pointless exercise as I can't speak or interpret a word of German.

Eventually the tour bus pulled away, by which time a fleeting half hour had

passed, and I began to think that I should leave too, for the temperature was continuing to rise and still the agamas were absent. Suddenly a head appeared from between two large rock slabs atop the fallen entrance. The lizard, only half-emerged and checking first to see that I was a sufficient distance away to pose no threat, clambered up to what I presumed was

its regular basking spot. I gave this saurian a few more minutes to position itself before levelling my camera at it and focusing for my "half-decent shot". Even with my camera on full zoom I decided I could get a better picture by carefully approaching the lizard. I only had to stand up and take a few steps, but as soon as I moved, the lizard promptly disappeared into



The Turkish Green Lacerta (*Lacerta trilineata cariensis*), occurs sympatrically with *Agama stellio* in Turkey. Photo by Bert Langerwerf.

After the Tourists have gone *continued*

the crevice. Fortunately, whilst I had been concentrating upon this animal, several more lizards had ventured out into the hot morning sun. They were even closer to me and less shy, so my camera clicked away busily for a number of exposures.

"Right!" I thought to myself, "Let me see if I can hand-catch one for a closer look." I had a snowball's chance in hell, which I quickly learned as one after another, they dove for cover. I considered the situation: Why aren't they more used to human intervention? After all, this place is visited several times a day by various organized tours, so these lizards should be more than used to human activity and at least be a little more approachable. It took the next morning for it to sink into my head that I was not going to be able to single-handedly catch a "Hardun" (the popular name for this species). One the third day, I enlisted the help of my teenage son and after much maneuvering one small agama was secured for examination. After a couple of close-up shots were taken, we bagged the animal so that it could be kept for a day or two in our hotel room and we could try to determine its diet from fecal analysis. The lizard was most obliging in this instance, and the following morning a fecal pellet was found in the bottom of the bag. Most of the identifiable material appeared to be wing cases from small black beetles, although we had seen a variety of other insects that were probably equally palatable to the agamas.

At the end of our first week in Turkey we traveled on an organized tour to the ancient city of Ephesus, a considerable distance north of where we were based. After first ascending to the biblical site of the House of the Virgin Mary - Meryemana, set high in the mountains overlooking Ephesus, we very literally descended upon Ephesus. As soon as we went through the entrance our eyes were peeled for lizards. We were not to be disappointed, for within minutes we sighted, caught and photographed a couple of small lacertids, both the Snake-eyed lizard, *Ophisops elegans*, and the Turkish Green Lacerta, *Lacerta trilineata cariensis*. From



The old Amphitheater in Bodrum, Turkey which proved to be ideal Hardun habitat. Photo by the author.

time to time we would slip away from the main party we were traveling with and scour the outskirts of the ruins for agamas and any other reptiles that might be present. Eventually the agamas became more and more evident, once our eyes had accustomed themselves to their outline, for they blend in perfectly with the rocks, looking grey and lichen covered like the stone itself. More obligatory photos were taken, and I began to notice how much larger the adults at Ephesus were compared with those at the small amphitheater at Bodrum, and at St. Peter's Castle which guards Bodrum Bay. But the agamas here were as skeptical of me as all the others I had previously encountered, and equally as nimble and unapproachable, so several long distance photographs were all we got on that day, too.

The habits of the agamas of St. Peter's Castle were similar to those of the colony at the amphitheater. The castle opened to the public at 8:00 a.m., early enough for those wishing to avoid the intense midday heat. I entered the castle one morning as soon as it opened, but did not see a single agama until at least 8:30 a.m., when my attention was drawn by a Little Owl, *Athene noctua*, that was perched

in the window of a tower up on one of the battlements. I poised to photograph the owl, and through my zoom lens I noticed it was watching something intently. It turned out to be an agama - what else! Maybe the Little Owl takes the occasional agama for a meal, although I have not read of this personally. At least I had found the agamas of St. Peter's Castle, where incidentally there is a tower called "Snake Tower" for reasons we were not able to determine. I was impressed by the fact that the majority of agamas seen within the castle grounds were found along the battlements, showing no fear of going over the edge if approached, even though for me there was a vertigo-inducing drop on the other side. Occasional lizards could be found at other sites within the castle. Most appeared to be young specimens that had probably been chased off by their highly territorial elders. However, we were visiting late in the season and witnessed none of the familiar "head-bobbing" seen commonly earlier in the year during the breeding season.

Because the breeding season had long since passed, the bright colors often associated with these lizards had faded, making them less conspicuous

continued on page 27

Herpful Hints from the Louisiana Herpetological Society

- Finicky turtles and some lizards, such as iguanas, can be offered food in shallow, bright red bowls. For them, red is an appetizing color.
- When constructing an aquarium, remember that amphibians and aquatic turtles often have trouble with vertical sides. Occasionally, they may become confused and get hung up in a corner, where they may swim until they exhaust themselves and

After the Tourists have gone

continued from page 26

but perfectly camouflaged against the grey stone. I pondered upon their existence, and how their thermoregulatory patterns were regularly interrupted by a curious tourist or the occasional prying herpetologist, but they seemed to accept the interruptions to their lives.

This year, my son and I visited Greece, and on the island of Mykonos we were in familiar company once again, for here there are an abundance of agamas, and by travelling earlier in the year we bore witness to the showy colors of mature adults and their head bobbing signals to each other. These agamas were no different in attitude to those of Turkey, shy and barely approachable, but still wonderful to watch.

We did catch agamas on Mykonos, but only with the aid of a 15 meter telescopic pole with a nylon noose at its end. A small number of the lizards were brought back home under licence so that I could continue to observe, and hopefully breed them. In the meantime I await the arrival of next spring so that I can once again witness their color transformation and courtship rituals. Those brought back to England have lost none of their shyness, preserving age-old survival skills by darting under or between rocks in their vivarium when I need to tend to them. They appear to be doing fine and feed heartily on a variety of insect fare, and I interrupt them as little as possible, giving them a well earned rest from the tourist/herpetologist. ♪

drown. A rounded pool with sloping sides all around is safer than a pool constructed at one end of the tank with only one side sloping out of the water. If you must use a square-ended pool, provide resting spots in the corners.

- Many herps, especially amphibians, have delicate, absorbent skin. Never wear perfume or lotions on your hands when handling them. To avoid damaging sensitive skin, remove rings and other jewelry.
- Pure aloe vera gel, available inexpensively at most drug stores, is helpful in the removal of difficult sheds.
- Herp keepers must seek alternatives to Lysol, pine-oil, and phenol-based household cleaners. Read labels: if an ingredient name contains "phenol" or "pheno-," do not use it. These substances can be deadly to reptiles and amphibians. Aerosol sprays of this variety are especially to be

avoided. For household cleaning, use mild cleaning solutions, such as soap, washing soda, bleach and water.

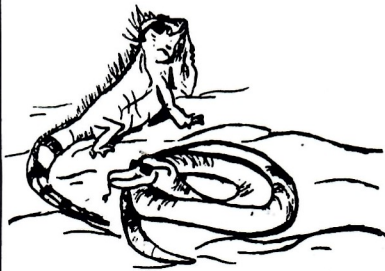
Avoid aerosol sprays of any kind. Aerosol or pump-type bug sprays are especially to be avoided; instead, use non-aerosol bug killers, such as boric acid powder, diatomic powder, roach motels and ant traps. Also avoid using other types of sprays near your herps. Perfume, hairspray and deodorant can harm your herps if inhaled, or if fallout from the spray lands in a water dish and is later ingested.

- If you smoke, your herps should be kept in a room designated as a no-smoking area.
- Dip the rump of mouse and rat pinks in a calcium-rich vitamin supplement before offering them to your herps. The developing bones of neonate rodents may not contain enough calcium to benefit your herps. ♪

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Letters to the Editor

Dear AFH,

I'm willing to bet that a symbiotic relationship with wholesalers wouldn't be number one on most beginner's list of goals. I have sent letters to wholesalers asking for much needed infor-

mation on the husbandry of certain snakes that appeared on their lists, and received no reply. Okay, maybe one of the letters was lost in the mail, but not all of them. I have also worked

in pet shops that dealt with a large inventory of reptiles and can personally bear witness to the quality of reptiles that some wholesalers send out. When the wholesalers send outwardly sick or parasite-infested reptiles to a pet shop this tells me that their eyesight is on only one thing, the dollar, not the reptile's well-being or the satisfaction of the future owner.

On the other hand the majority of the private breeders I have dealt with give an overwhelming impression that they are concerned with the well-being of their animals and that they are in the business first out of love for herps, not money. The majority of private breeders offer better quality and also guarantee that what one receives will be healthy and feeding. They are also concerned with the knowledge level of the future owner and often supply information to anyone. This is why I and many others split private breeders apart from the pet industry. In my opinion if the pet industry wants a symbiotic relationship with the rest of the body of herpetoculture, they should start acting like it. Wholesalers and pet shops should become more knowledgeable (many are so ignorant they shouldn't be selling herps) and more responsible about how they keep their herps and what they sell to their customers. They need to quit alienating the beginners that are so essential for the growth of their business. Let's all start working together so there will be a better tomorrow. I know many other private herpetoculturists feel the same way I do.

► *Alfred J. Fleming*

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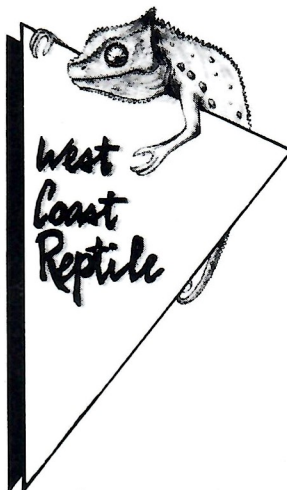
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Ask The Expert

by Ernie Wagner

Are you in need of herpetocultural advice? Are your lizards having relationship problems? Are your tortoises performing unusual behaviors? Has your snake come down with an embarrassing skin ailment? Are you uncertain about the best way to raise your baby frog? And what about all those new fad salamander diets?

Noted herpetoculturist Ernie Wagner has agreed to answer your herp husbandry questions. Please send your questions (phrased as specifically as possible) along with your name, address, and phone number to: Ernie Wagner, 354 N. 76th., Seattle, WA 98103.

Q I am trying to get my corn snakes to breed. I hibernated them during the winter, and they are active and feeding now, but whenever I put them together, the female seems nervous and afraid of the male. How do I know when to put them together to get them to breed?



The Corn Snake (*Elaphe guttata*) is one of the easiest and most predictable species to breeder. It's also a fairly prolific egg layer. Photo by Vince Scheidt.

A You're on the right track so far. The first thing is to check sexes and make sure that you have a sexual pair and not two males. Often when snakes are introduced to each other they may show some initial nervous-

ness, but this usually passes quickly. What is going to trigger reproduction in your snakes is environmental manipulation; winter cooling for about three months at temperatures of 50 to 60 F (10 to 15 C), followed by warming in the spring, back to your normal cage conditions. I usually cool my snakes around November and begin by making sure all food has been digested, then gradually dropping the cage temperature over a three week period, until all heat and cage lights are off. In the spring, I warm the cages back up the same gradual way until snakes are feeding and behaving normally. This environmental manipulation will cause sperm development in the male, and the ripening of the ovarian follicles in the female. At this stage of the process, the female will produce pheromones (external hormones) which will attract the male and lead to copulation. The best solution is to house your snakes together after you bring them out of winter cooling so

that this sequence can follow its own course.

Q The tail broke off on my African fat-tail gecko. How long will it take for it to re-grow, and

do I have to give it any special vitamins during this time?



The African Fat-tailed Gecko (*Hemithecconyx caudicinctus*), like many geckos, will drop its tail if handled roughly. Tail loss may also result from breeding interactions or other causes. Note regenerated tail in this specimen. Photo by John H. Tashjian.

A African fat-tail geckos, *Hemithecconyx caudicinctus* will probably re-generate a tail in about six months. Other than its regular vitamins/minerals dusted food, no special dietary supplement is needed during this time. One interesting note about this species is that it is only the animals which have re-generated broken tails, which have a truly "fat" tail, shaped like the lizard's head. Original tails will store fat, but are longer and more slender with a pointed tip and are not shaped like a head.

Q I have two Argentine horned frogs which are about two years old. How can I tell if I have a sexual pair?

A Argentine horned frogs, *Ceratophrys ornata*, are relatively easy to sex as adults. Females grow larger than males and males will develop a darker throat with excess folds of skin which form the gular pouch during vocalization. If one of yours is a male, you should have heard it calling by now, especially after being sprayed down with water.

First World Congress of Herpetology *continued from page 14*

been witness to man's works for over two thousand years.

The Congress was organized around daily symposia on the university campus, and two plenary sessions held in the Marlowe Theatre in Canterbury City on the first and last days.

Topics covered every aspect of the science of herpetology. Examples included, "The State of Herpetology," "Conservation and Captivity," "Ecology and Behavior of Snakes," "Energetics of Amphibians and Reptiles," "Herpetofaunas, Explorations and Studies," "Ecology and Conservation of the Tuatara," "Evolution and Life History of Turtles," "Amateur Contributions to Herpetology," "Photographic Techniques," and "Medical and Herpetological Aspects of Venoms and Skin Toxins," just to name a few. The most difficult challenge was choosing which to attend, because, as the sessions ran concurrently, there were frequent conflicts where two or more of interest were occurring at the same time.

A spectacular slide presentation entitled "The Herpetological Audiovisual Extravaganza" incorporated the simultaneous use of six slide projectors and symphonic sound in a two hour

program. The program had three subjects: "Herpetology Past and Present," by D.M. Dennis and Kraig Adler; "Amphibians of the Appalachians," set to the music of Aaron Copland's "Appalachian Spring," by D.M. Dennis and J.E. Juterbock; and "Herpetology of the Western United States," set to the music of Igor Stravinski's "Firebird," also by D.M. Dennis and J.E. Juterbock. Dennis and Juterbock also gave valuable advice during the workshop on "Photographic Techniques."

Evenings were occupied with more symposia, herp association meetings, and time to meet friends in the lounges of Eliot and Rutherford Colleges. Special refreshments were available to delegates including, "Tortoise Bitters" and "Herpetology Ale," brewed "especially for the Congress." Lest delegates become bored with just two choices, the whole gamut of traditional British refreshments were also available. The program also stated, "At the Barbecue we will serve another startling beer called 'Snake Bitter' to celebrate the Chinese year of the Snake."

Social events included a reception for all delegates hosted by the Lord Mayor and Council of the city of Canterbury the opening evening. Entertainment at that reception included the Canterbury Bagpipe Band and a group performing "Folk Dances of the Forest People." A band of the "Royal Green Guard" provided a show of the pageantry of British military music and marching drills at the barbecue the closing evening. Later that evening, an auction of herp paraphernalia, books, posters, and souvenirs donated by delegates was sponsored by the Society for the Study of Amphibians and Reptiles.

The large number of delegates made it both easy and difficult to meet people. Delegates were easily able to meet others, but because of the numbers, those sharing similar interests could not so easily meet. By the end of the week, however, most different groups had communicated with one another and many new friendships were formed.

From the personal discussions,
continued on page 31

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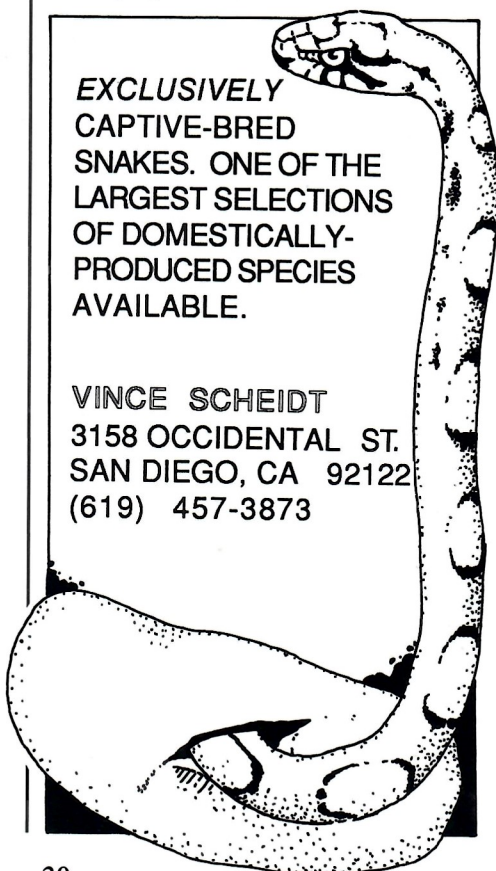
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First World Congress of Herpetology *continued from page 30*

meetings, and individual experiences of delegates an "agenda for the future" appeared to emerge from the Congress. Although parts of the "agenda" are familiar issues, the Congress caused an awakening of how many individuals from so many different backgrounds and nations shared the same goals, priorities, and concerns.

Most of these goals, priorities and concerns were not identified by formal resolutions, but rather were undercurrents of thought which seemed to be shared by the delegates from the 69 nations. A summary of the "agenda for the future" would include, but not necessarily be limited to:

An unanimous concern about stopping the destruction of the natural environment in the world and the need for conservation of resources.

A concern for preservation of habitat whether in the Amazon or Pocatello, Idaho, U.S.A.

Ceasing the destruction of tropical rain forests and the desecration of the resources of the land through unnecessary and unplanned development.

Concern about the imminent need for preservation of species in the wild, in captivity, and through research.

Concerns about the need for ethical behavior in dealing with amphibians and reptiles in the wild, in research, and in captivity.

Urging conservation organizations to give higher priority to the needs of amphibians and reptiles.

Increasing the attention given by the herpetological community to educa-

tion and political activity to improve the condition of amphibians and reptiles.

Increasing the mutual understanding of all the diverse contributions to herpetology from all who are concerned for amphibians and reptiles. Herpetology attracts people from all parts of societies: Scientists from different academic disciplines; Zoo personnel; Animal welfare groups; Children; Hobbyists; Breeders; Ecologists; Elements of the pet trade; and others, including, like it or not, some "kooks" and "nuts." Our agenda must transcend all of these groups and attitudes in finding means to protect the animals and the environment.

Understanding, creating, supporting, and utilizing political and economic resources to persuade the world's leaders to understand the need for preservation of amphibians and reptiles. (It must be remembered that the world's political leadership begins with the local city councils and elected or appointed officials in individual towns, cities, counties, states, provinces, territories and nations. It begins right where people live, not in some far away place)!

So, this emerging agenda is for all concerned with amphibians and reptiles, not just "Amateurs" and "Professionals" for the true herpetological community is as large as the goals which must be achieved. And it must be remembered the agenda is especially for those *not* now concerned with amphibians and reptiles! It will do no

good for herpetologists to talk only to and among themselves. If the common goals are to be achieved, it will take each person with his or her individual talents to make voices heard in a seemingly uncaring world.

Once again, most of this agenda is not new. All of the issues, from preservation of habitat, to the ethics of keeping specimens, to understanding the contributions of professionals and amateurs are not new. Addressing these issues and resolving the problems they create will require serious, dedicated, tolerant, and determined work from the herpetological community worldwide.

What is now new, however, is the focus. From the hills overlooking tow thousand years of history in Canterbury, delegates were able to see a timetable for the future. That timetable is short, given the conditions of the planet, but the delegates capacities to meet it have been strengthened because of their increased awareness of their diverse talents.

Biologists need not expect to be political lobbyists, just as most politicians are not scientists - But the fact there is a shared concern for amphibians and reptiles can unite diverse individuals and groups. This unity can become a powerful force to preserve those animals and habitats, which are a necessary and significant part of the life and land of our world.

One of the most significant and long term achievements of the First World Congress of Herpetology is that it happened. Delegates' views of themselves and the world were changed and enhanced because so many were together at one time discovering shared knowledge.

Because the World Congress happened once, it will happen again. In fact, according to the World Congress of Herpetology Constitution adopted by the delegates, it will happen again within three to five years.

The First world Congress of Herpetology manifested some common interests and goals shared by "herpetologists" throughout the world. Because of this, the next World Congress will be well equipped to continue acting on those goals. ☺

Coming Events

June 15-20, 1990: American Society of Ichthyologists and Herpetologists. Charleston College. Contact: Robert K. Johnson, Grice Marine Lab, 205 Fort Johnson, Charleston, SC 29412.

June 20-23, 1990: Fourteenth International Herpetological Symposium on Captive Propagation and Husbandry. Dallas-Fort Worth Holiday Inn. Contact: Thomas A. Huff, Program Chairman, Reptile Breeding Foundation, P.O. Box 1450, Picton, Ontario K0K 2T0, Canada. (613)476-3351.

August 3-5, 1990: 1st National Reptile Breeder's Expo presented by The Central Florida Herpetological Society will be held at the Howard Johnson Florida Center Hotel, Orlando, Florida. Breeders will

display their offspring. For more information, contact: Wayne Hill at (813) 294-2235 or Jay Veltkamp at (407) 333-2615.

August 5-10, 1990 Annual Meeting of Society for the Study of Reptiles & Amphibians (SSAR) and the Herpetologists League (HL). At Tulane University, New Orleans. Contact: SSAR, Dept. of Zoology, Miami University, Oxford, OH 45056.

August 10-12, 1990: Symposium on Turtles and Tortoises will be held at Chapman College, Orange, California. Contact: Kent Beaman, World Museum of Natural History, Loma Linda University, Riverside, CA 92515-8247 or phone Sean McKeown at 209/498-1096.

Please submit notices of any herpetological or herpetocultural event other than regular local society meetings. Notices may be of events anywhere in the world and should be submitted as soon as a place and date has been set. Submit to: Coming Events, A.E.H., P.O. Box 1131, Lakeside, CA 92040.

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