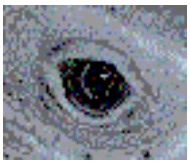

IGUANA CARE, FEEDING AND SOCIALIZATION (ICFS)

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Preface

This is the article that grew and grew and grew, starting out as a one page caresheet I was told no one would read because there were too many words and not enough little white space on the single piece of paper.

Happily, people read that one page caresheet and wanted still more information. Their Iguanas needed their owners to have more information, too, as iguanas were now being kept alive for more than a year. Better yet, once iguanas were being cared for properly, they started growing normally and reaching sexual maturity when they should. Within a couple of years, that one page grew to 12 pages, then 44 pages. As of this update in July 2002, it is now 79 pages.

Available online since 1994, that "caresheet" formed the kernel of what has become my collection of green iguana care, health, behavior and conservation information collection. This *Iguana Care, Feeding & Socialization* article alone has been accessed by hundreds of thousands of iguana keepers, veterinarians, and zookeepers looking for information on how to properly setup, feed, and start taming their iguana.

Much of this information, as well as some of the other information in my iguana care site, may also be found in my book, **Iguanas for Dummies**. Since the **…For Dummies** series is intended cover the basics of the books' subject, my **Iguanas for Dummies** book is a handy and useful adjunct to the more advanced and, in many cases, more detailed, information found at my site.

When To Read This Article

The best time to read this article is *before* you get a green iguana. The number of dumped iguanas each year attests to the fact that too many people who get them would not have gotten them--for themselves or for their children--had they any idea how difficult (and expensive) it is to care for them properly. If you still feel up to the challenge of taking on a green iguana after reading this article and the ones linked to it, then at least you will be doing so having a better grasp on what to expect from these large, lively, complex lizards.

It's Never Too Late To Make Things Right

Most people read this article after they already have the iguana. The iguana may be one they went out and bought. The iguana may have been rescued from people who were mistreating or neglecting the lizard. Some "inherited" the iguana from a now-former spouse or roommate, or from their now-bored or off-to-college kid. By the time many of these owners come across this article, their iguanas have experienced months or years of improper diet and environment. Some iguanas may be seriously ill (with metabolic bone disease or infections) or are teetering on the edge. Many of these iguanas are not tame. Most have never had their claws trimmed nor been examined by a reptile veterinarian.

The good news is that it is rarely too late to start doing it right. While instituting proper diet and care may not completely reverse the damage caused by the original care practices, most of these iguanas will go on to lead healthier lives. Even if they never live to ripe old iguana age, the vast majority will live much longer than they would have had the care they received not been corrected. Iguanas whose growth was retarded or stunted often start growing again, many more than doubling in size.

The same goes for taming. The information on taming and socialization in this article works on untamed adult iguanas as well as on hatchlings. Iguana owners will also need to read the information in the articles on iguana breeding and dominance behavior to find out what to expect once their formerly malnourished iguana gets healthy.

In other words, it is rarely too late for the iguana. More importantly, it is never too late for people to learn new things to improve their care and interactions with their green iguanas.

Minutiae

ICFS Organization

By breaking the online version of this article into multiple files, each section will load faster for those readers using slower lines or modems or older computers.

There is a tremendous amount of material to read and re-read. To increase access, I have made this article is available in MSWord, plain text, and in PDF formats so that it can be easily saved for offline reading and printing.

The sections in this article follow the basic aspects of care: an introduction to green iguanas; their environmental requirements; issues and problems relating to diet; preparing and presenting food and water; social structure, taming and socializing; and basic information on the need for veterinary care.

A Note On Gender…

For purposes of readability, I will use the pronoun *he* when referring to iguanas and humans in general. If something relates specifically to females, *she* or *her* will be used as appropriate.

Repetition

Because some people will read sections out of order, and because some things are very important, some subjects or points will be repeated for emphasis or will appear in more than one section of this article.

Product Recommendations

In this article and in other articles at my site, you will see that there are some products I recommend by name, as opposed to by type. You will notice something else at my site: no advertising. If I accepted advertising revenues or accepted offers from some of the companies whose products I recommend, you could not be sure if I was making the recommendations because I believed in the product or if I was in anyway obligated to make those recommendations.

The product recommendations I make are because I have tried the product and found that it meets the needs of my iguanas and the criteria I use to judge a product safe or appropriate for the uses to which I put them and recommend they be used.

PART 1: INTRODUCTION

In the early 1990s, over a million green iguanas were being imported each year. By the late 1990s, the number had dropped to under one million. During that period of time, the way many people cared for and interacted with their iguanas has slowly improved. There are still many problems due to outdated and inaccurate information still being spread by stores, book and magazine publishers and, now, the many websites whose information is largely or completely based on poor information sources, most stemming from the pet trade.

In general, the pet trade literature has historically lagged 20-30 years behind most of the research findings of biologists and veterinarians on the cutting edge of exotic animal medicine. This has had tragic consequences for exotics of all types, but especially for reptiles and amphibians, due in large part because most people incorrectly believe that "cold-blooded" means "incapable of feeling pain or suffering."

In fact, good information has been available in the biology literature for well over a decade. During this same time, giant strides in reptile medicine have been made as veterinarians have pooled their knowledge and experience, publishing research and articles in new journals. Reptile vets such as Stephen Barten, Stephen Hernandez-Divers, Thomas Boyer, Elliot Jacobson, Scott Stahl, and many others have been very active in clinical practice, research, and teaching other vets through symposia and publications. Their work has had an enormous impact on reptile veterinary medicine to date, and their efforts continue to make inroads into the practices of many vets who previously saw few and knew less about reptile patients.

During that same time, veterinarians and animal nutrition researchers such as Susan Donoghue and others focused their research in the areas of reptile nutrition for zoo animals, extending their work later to reptile pets. The latter was important because, especially when it came to iguanas, it was the first research that was geared to keeping iguanas alive and healthy for a long time, not just until they became big enough to eat.

Because of the lag time between actual knowledge and the state of pet trade literature, however, little of what has been published in veterinary and other research sectors during the last decade has made its way into the pet trade literature.

With the very small exception of iguana keepers and breeders such as David Blair and Jim Hatfield, most literature in the pet trade and bookstores simply repeats previously published often outdated information, including the inaccuracies found in those earlier works.

What all this means to reptile keepers, especially iguana keepers, is that they have to work harder to benefit from the most current understanding of their species' biology and husbandry. The intent of this ICFS article, in conjunction with the other iguana and reptile information at my site, is to bring the two bodies of knowledge closer together. What I provide is a synthesis of information from the veterinary and other research literature, as well as that drawn

from my own experiences and those of others, and direct observations in keeping, rescuing and working with iguanas. Iguana keepers who read and use the results of this work will obtain a better understanding of their lizards.

Learning how iguanas function and behave the way they do will enable iguana keepers to better provide for their iguana's needs and help keep their iguanas as well-adjusted as possible in what are inescapably the completely alien conditions of captivity.

Effects Of the Pet Trade On Iguanas

Iguanas have become one of the most popular lizard pets, and, tragically, one of the most disposable. Pet stores that previously only sold supplies are now carrying reptiles, often showcasing their iguanas. Pet supply manufacturers are repackaging existing products and competing with each other to get as many new iguana products out on the market to cash in on the craze.

When I got my first iguana, they were selling in stores for $100 and up. Now, most pet stores sell iguanas for as little as $10. Since most buyers are loath to spend more on the equipment and supplies than they are on a cheap lizard, iguana mortality rates remain high. Since most pet stores don't know--or care--what iguanas require to survive and thrive in captivity, they don't push their customers or, just as common, push them into buying the wrong things. If pet stores were honest, and posted signs that said "Iguana: $10; Required Equipment/Supplies: $350", they'd have very few buyers. So, it works to their benefit to remain ignorant about proper reptile care.

IGUANA EXPORTS

Your iguana came from one of the many countries in Central and South America that export green iguanas. These iguanas are either caught in the wild, hatched in conditions similar to "puppy mills" from eggs laid by a wild-caught or captive pregnant females who are highly stressed and usually malnourished and suffering from parasitic and systemic infections.

Observers in Central America report that huge numbers of wild iguanas are being exported from El Salvador, a country which, though it is signatory to CITES, does not have--or does not care to have--the structure in place to monitor infractions. Domestic captive breeding (that is, iguanas being bred in the same country in which they will be sold as pets) is not a real option. To raise healthy adults, closely monitor them during breeding season, and hand-raise the hatchlings results in iguanas who are far more expensive than those sold in the pet stores. Until imports are stopped, wholesalers and pet stores will continue to buy iguanas for a couple of dollars they can make a few bucks on.

Of course, if people stopped buying imported iguanas, importers would stop importing them because stores wouldn't be ordering them. There are tens of thousands of iguana needing new homes every year. Adopt one from a rescue or buy one from a private individual who has bred his own iguanas: don't buy imported iguanas.

Iguana Farms

Farmed iguanas are not any healthier than wild-caught ones. Unlike hand-raised captive bred bird hatchlings, farmed iguanas are, like their wild-caught counterparts, stuffed into canvas bags which are then jammed into crates with dozens of similarly packed bags, the crate nailed shut and started on its way, all within a few days of being hatched. [1]

Where Your Iguana Is From

Most green iguanas (who may not be green when they reach adolescence or adulthood) live in the wet and rain forests of Central and South America; some come from drier areas and along the

coasts. The ones commonly found in pet and reptile stores come from Columbia, El Salvador, Honduras, Peru, Mexico and Surinam.

The exporting countries change from time to time, and it is not possible to know where your iguana came from, despite what the pet store may tell you.

Species Status

The forested areas in which iguanas live in are under tremendous pressure. The trees are being felled for export and to make room for the expanding human population. Iguanas and other reptiles are part of a multi-billion dollar international wildlife trade, a trade built upon feeding the increasing desire for the odd or unusual plant, animal and animal artifact (such as skins).

Green iguanas are classified as *Threatened* and are so listed on Appendix II of the Convention of International Trade of Endangered Species (CITES) [2]. This means that the exporters and importers must have special permits to move these reptiles across country borders, but it is legal for anyone to buy them once they reach their destination. Other types of iguanid lizards, such as the *Cyclura*, are in danger of extinction and have different import and export laws regulating them.[3]

IGUANA IMPORTS

The 1974 International Zoo Yearbook stated that of the 403,319 live reptiles imported into the United States in 1971, 136,993 were iguanas. This was the largest number of any singles species imported into the U.S. that year. Also imported that year were 27,727 boa constrictors and 39,892 lizards of other species.

In 1990, TRAFFIC USA, a program of the World Wildlife Fund, reported that 1-1.5 million live reptiles were imported into the U.S., as well as 3-4 million whole skins, 865,000 partial skins, and 20-30 million products manufactured from reptile artifacts, all totaling some $475-500 million in declared value. Of those one million or so reptiles, the green iguana remained at the top of the list, around 300,000 (1990 trade data).

In 1993, the US Fish & Wildlife Service (USFWS) data showed that over 750,000 iguanas were imported that year. That comes out to well over 2.6 million iguanas that legally entered the country in the past 18 years.

Imports had dropped a bit by 1998. In that year, 479,438 green iguanas were imported, with the importer paying an average of $1.33 per iguana (USFWS data).

Given that green iguanas can, when cared for properly, live easily in excess of 15 years (with 20-plus years not unknown), why are we not seeing big, older iguanas?

Because iguanas are not the simple easy-to-care-for animals portrayed by the pet trade, and because bad information is still more widely available than good information, far too many iguanas continue to die from preventable diseases. Many of them end up being passed around from person to person because none of the owners has learned how to or is willing to take the time--and money-- needed to care for and tame them.

Natural History

Your iguana is known to herpetologists (people who study reptiles and amphibians) as *Iguana iguana*, or the common green iguana. (For more information on iguanid species, please read Iguana Classification [4]).

Young iguanas are very green and blend in well with their habitat--the leafy dim lower levels of the rain forest canopy. Their tail is striped to help them disappear while lying still on a branch; their spots and stripes of body color also help them blend in. Older iguanas live higher up in the canopy where it is lighter and somewhat drier. In captivity, young iguanas require a more humid environment; keep them at 70-80%, a level that is usually significantly higher than ambient room humidity.

Not surprisingly, green iguanas of all ages are excellent climbers--up and down-- on any vertical surface on which they can get a claw-hold. They are proficient swimmers, holding their legs close to their body and using their tail to propel themselves through the water, similar to the way crocodiles and alligators swim.

The pet trade seems fond of stating that "reptiles get all the water they need from their food". This theme is also carried through many of the inaccurate pet care books and other works based on these sources. The fact is that arboreal lizards get some of their water needs met by drinking rain and condensation on collecting on the flowers and leaves of the trees does not mean they obtain all their water requirements that way. Iguanas do indeed drink, often heartily, when they descend to drink or swim across lakes, rivers, and streams.

In the wild, iguanas eat lots of leaves and some flowers and soft fruits. In the spring they eat the leaves of plants in the legume family that are high in protein. Despite the information commonly found in the pet literature, field and lab research has repeatedly shown that iguanas are not omnivores. They are strictly herbivorous and should be fed as such in captivity. This doesn't mean that there isn't the accidental ingestion of bugs or carrion in the wild. It also doesn't mean that there aren't some iguanas that exhibit some animal protein seeking or sampling behavior. Iguanas naturalized outside their range may also have adapted as a population to the regular eating of animal protein.

However, iguanas in their native habitat are herbivores with a digestive system evolved to make efficient use of high fiber, hard-to-digest plant matter. Feeding animal protein in captivity is unnecessary and will cause early death, usually due to kidney failure. [5]

A Day in the Life

The daily routine of an iguana is centered on warming up, getting rid of yesterday's food, getting and eating more food, basking, may going to eat some more, basking again, and going back to bed.

To be more specific: as the morning sunlight begins to penetrate the overhead forest canopy, the iguanas begin to move from their night sleeping places to a branch where they can soak up the sun's heat. After a few hours, they are warm enough to defecate and move around and forage for food. After climbing, searching and eating for a couple of hours, they move to a basking site to catch the last of the afternoon heat; they must be warm enough to digest the food they have eaten before they go back to their night sleeping places. While all of this is going on during the day, the iguana also has to be on the lookout for bigger iguanas looking for smaller iguanas to intimidate, and for other animals that consider iguanas to be a tasty addition to their diet. Male iguanas also have to avoid entering (or being caught in) another male iguana's territory.

During breeding season, iguana activity levels increase as male iguanas are looking for females and uninterested females are generally trying to avoid overzealous males. At the same time, younger sexually mature males who have yet to carve out their own territory are trying to grab what they can when they can as often as they can.

The smaller the iguana, the farther down the food chain they are. Young iguanas are near the bottom of the food chain, being eaten by carnivorous and omnivorous reptiles (including snakes and caiman), large amphibians, birds and mammals. In some areas of the green iguana range, "mammals" included humans. This helps explains why your new iguana is terrified of you--he thinks you're a giant predator ready for an iguana snack.

Thus, iguana days are filled with bursts of activity punctuated by long periods of quiet rest. These behavioral patterns occur in captivity, as well, with sexually mature iguanas exhibiting the seasonal variations of their wild cousins. Outside of the breeding season, iguana behavior research has found that wild iguanas spend 90-96 percent of their time doing pretty much nothing.

Longevity

In the wild, iguanas are expected to live for 10-15+ years, assuming they don't become someone's entrée and escape being captured and crated for export. If cared for properly in captivity, they may live for 20 years or more, reaching a length of 5-7 feet (1.5-2.1 m) , weighing up to 18 pounds

(8.18 kg), with females, and males from some areas, being smaller when full grown. I know iguanas well into their mid- and late 'teens. A 29 year old iguana is pictured in Jim Hatfield's iguana book, Green Iguana: The Ultimate Iguana Owner's Manual.

SUMMING UP

The above information is provided to help lay the foundation for why we do the things we need to do for our captive iguanas, including housing design, building their diet, and the establishing of daily routines. This information, along with the other information at my site, will also help you to understand what your iguana does (or doesn't do). Since research is still on-going, the information here can be considered to be a work-in-progress.

Care for your iguana properly. Learn to tame and socialize him. Learn how to interact with him during breeding season, pre-shed crankiness and all the other times and moods iguanas go through. When you do all of these things, you and your iguana should enjoy a long and healthy relationship.

If any of the necessities are not provided, your iguana may end up stunted, sick, deformed or dead. While there are some variables when it comes to interacting with an animal of any species, exotics such as iguanas are so dependent upon our knowing what we are doing for them. Their care and well-being depend upon us learning to understand how to act and react with them. We hold complete power over whether they survive and thrive or don't. Only you can keep your iguana from being just another fatality or dumped statistic.

PART 2: CREATING A HOME

Creating a home for an iguana is more than throwing together a 10-gallon tank, hot rock, cutesy bowl, and tossing some pretty bark on the ground. (In fact, that is exactly what you should not do!) It is also more than lining the back of a 30-gallon tank with a tropical rainforest backdrop and putting in some plants and branches.

In creating a home, we must provide for the iguana not only as he is today, but also as he will be in the months and years to come. The captive environment needs to provide a safe place for your iguana to be when you aren't around as well as when you are. The iguana environment needs to be functioning independently of your own environment when it comes to its temperatures and humidity.

That means that if it is -10° F (-23° C) outside, and 65° F (18° C) inside your home, your iguana's environment must still be 75-88° F (24-31° C) with a basking area of 88-95° F (35° C) during the day, and 70-84° F (21-28° C). If you don't leave your air conditioning on while you are at work on days when the outside temperature tops 100 F, you still have to make sure your iguana's environment maintains the iguana's required gradient, no matter how hot it gets in the rest of your home. Iguanas, like all other reptiles, can be killed temperatures that are too high just as they can by temperatures that are too low.

Meeting the iguana's environmental needs means you need to provide the right type of lighting and heating, no matter how much it costs. It means that you must keep the humidity up as much as you can without risking health problems and structural damage. It means providing the photoperiods (daytime light/nighttime dark cycles) he needs, not what may be more convenient for you due to your school, work or sleep schedule.

Meeting their needs means going crazy trying to keep everything straight, spending time learning things you never thought you'd have to learn, and regularly checking everything because if something can go wrong, it *will* go wrong, usually at the least opportune time.

If you live off the grid, or are dependent part of the time on generators or propane, or live where electricity regularly goes out during periods of severe weather, you still have to provide for your iguana. While a healthy iguana may, under some circumstance, be able to survive a week of temperatures in the mid to high 60s (19-21 C), he won't last much more than that. Unlike you, an iguana can't bundle up in warm clothes or huddle by a wood stove or fireplace, so be prepared to install backup power sources to provide the tropical temperatures your tropical iguana requires throughout the year.

Enclosure

The costliest initial mistake made by iguana keepers is starting off with too small an enclosure. Enclosures aren't cheap to begin with, but you save nothing by buying less expensive small enclosure. Kept properly, iguanas grow fast and need lots of room to move around in while they are doing that growing.

When you start off with the usual 10-40 gallon enclosure, it may look large enough to you, but it isn't large enough to provide the thermal gradients the iguana needs. It cannot provide the open space they need just to move around in without constantly banging into food bowls, water tubs, branches, etc. Finally, as you will find later when reading about taming and socialization, iguanas are highly territorial. Keeping them in a too-small enclosure at any age intensifies their reaction to their territory being invaded, even when the "invader" is your hand and arm putting in fresh food and water. This territorial response kicks in about the time that the iguana finally realizes that you aren't going to eat him. So, to give both of you the best opportunity early in the relationship, start off with a large enclosure, even if the iguana initially looks "lost" in it. Hide boxes and visual screens during the first couple of months will give him secure-feeling places to go when he's feeling over-exposed to prying eyes.

Start with a least a 60 gallon US (50 gallon UK) tank with a secure lid or a similarly sized wood and glass/Plexiglas top-, front- or side-opening enclosure. Glass enclosures are available with a securely fixed screen across half the top of the tank and a hinged glass lid securing half of the top. These tanks are easily cleaned and disinfected. While a 60 gallon tank may seem huge for that teeny baby iguana, a properly cared for hatchling will outgrow that enclosure by the end of its first year, and outgrow a 100 US (83 UK) gallon tank shortly after than (see Determining Iguana Age and Size).

Enclosures *not* suitable for iguanas are those that are primarily mesh, as mesh does not hold in the heat. While this may not be a problem during hot summer days when the room air temperature is in the mid-80s, it is a problem the rest of the year as you have to heat the entire room to tropical temperatures--day and night--in order to keep your iguana warm enough. If you aren't the one paying the electric bill, or have no idea how much the additional heating and lighting equipment will cost, you can run some calculations before you get your iguana to see if the monthly cost is something you can sustain. The Calculating the Cost of Electricity article discusses how to do so.

Mesh is also a problem if the wrong type of mesh is used. Fine mesh, such as window screening material, will shred under persistent iguana claws--and iguanas are very persistent. Poultry wire (also called chicken wire) has large holes. The wire itself is stiffer than window screening, but thin and sharp enough to cause serious injury to iguana noses and toes when they rub against it (that persistence thing again) and climb it. Hardware cloth (woven wire), especially the plastic-coated ones, are suitable for ventilation panels or outdoor enclosures. You can also use it to make a "convertible" enclosure, one that is mostly hardware cloth to take advantage of the summer heat, with easily attached solid wood and Plexiglas panels that will hold the heat in during the cooler nights and seasons.

LOCATION, LOCATION, LOCATION

Where you set the iguana's enclosure up is as important as how you set it up. If you set up the tank where the TV or music is blaring, people are rushing around, kids are yelling, and dogs barking, all of this will frighten and stress your new iguana. It's not that great for older iguanas, either.

Too far out of the swing of things is also a problem, as iguanas, especially when they aren't yet tame, tend to fall into the "out of sight, out of mind" category. Sticking them in the garage and on the back porch is also not a good idea. Garages tend to be too cold and dark. Porches may be too hot and too cold, depending on the season. There also isn't much human or other activity to watch in either place.

What most people who keep iguanas fail to realize is that iguanas are relatively intelligent lizards. Captivity is, for most captive animals restricted to an area far smaller than their normal range in the wild, is mind-numbing. The larger the animal, the worse the boredom. Just as zoos have started to develop behavioral enrichment programs for their residents, so, too, must iguana keepers keep in mind that iguanas not only need to be kept in conditions that promote their physical health, but one that also promotes their mental health.

Place enclosures where iguanas can look out of a window when there are no humans around. Movement and activity attract their attention, so plant a garden with plants that attract birds and butterflies, or hang bird feeders to attract seedeaters or humming birds. (Hint: hummers are easier to watch when they are at rest, so buy hummingbird feeders that come with perches. Hang a couple of hummingbird feeders so that more of these territorial birds will be able to frequent your yard.)

Place the enclosure in a room where, when people are home, they can watch people doing relatively quiet things and where the lights and noise quiet down during the iguana's night period. This means the room needs to be dim, if not completely dark after sunset. Bright lights and loud noise going on during the iguana's sleep period is just as disruptive to animals as it is to humans: just because the person (or iguana) is sleeping through it doesn't mean that long-term health problems aren't brewing.[6]

Lifestyle

In the wild, hatching iguanas live in the lower levels of the green iguana habitat. They are quite comfortable in trees, scaling higher and higher the bigger they grow.

With their razor-sharp hook-like claw tips, iguanas can easily climb and descend trees. When they are descending head first, they will pause to check things out, their claws and surprisingly strong toes apparently comfortably supporting their weight. When it comes to lounging or sleeping, however, iguanas are rather like humans and most other animals: they like to lay down flat, all stretched out.

In captivity, this means we must provide an enclosure that is both tall enough so that they can comfortably climb, and wide enough so that we can set up the horizontal gradient and accommodate the iguana's overall length within the different areas of the horizontal gradient (basking, warm, cooler).

Along with the height and width, we also need to provide very large diameter branches installed horizontally, or wide shelves, for them to lay down on comfortably. The width is important for two reasons: your iguana is going to keep growing wider as well as longer and taller, and he will need to turn around when he wants to move to the other side of the enclosure. For medium and large iguanas, this means either using shelves or branches the size of many tree trunks to provide this kind of sprawling and turn around area. (While they don't have shelves in the wild, they do have lots of branches and trees around them so a misstep and fall doesn't result in them plummeting to the ground as can happen in captivity.)

If you are using a commercial glass tank, by now you are realizing that it's tough to install shelving in there, let alone climbing room. There are a few things you can do, such as make a hammock attached to the sides of the glass with suction cups fitted with hooks, or construct a shelf by supporting a length of wood on two half bricks or blocks of wood. The hammock is fine for very small iguanas. Suction cups may not be strong enough to support a larger one when the cups are mounted to glass.

ENCLOSURE SIZE AND SHAPE

What you don't want to do is buy--or build--a coffin, cube or telephone booth. A coffin (long width, short height), cube (square), or telephone booth (tall and narrow) do not allow for the width, height, or thermal gradients larger iguanas need. Cubes and telephone booth-shaped enclosures are too narrow, leaving the iguanas clinging to vertical or diagonal surfaces all the time. In coffins that are of the necessary length, there is enough room to get the majority of their overall length in the different areas of the thermal gradient, but the iguanas are not provided the opportunity to

climb up or down. Such iguanas are unable to develop the strength and agility typical of normal, healthy iguanas. This impaired coordination leads to an increased tendency towards traumatic injuries when they are allowed out of their enclosures to roam around the room or home. Finally, females who are not permitted the space to climb up and down tall vertical surfaces have more problems laying their eggs.

So, how wide and tall should your iguana's enclosure be? By the end of the iguana's first year (that is, 12 months of age), the iguana will have outgrown commercially available enclosures. That means you have less than 12 months to design and build your own (or have built) an adult-sized enclosure. That enclosure will be at least 6 feet (1.83 m) tall, and the depth at least 3 feet (0.92 m) deep (front to back). The width (side to side) needs to be at least 1.5-2 times the iguana's projected overall length over the life of that enclosure. The following table is based on the information in the Determining Iguana Age and Size article. Figures have been rounded as appropriate.

Age (years)	Iguana Total Length (in.)	1.5 x (in.)	2 x (in.)	Iguana Total Length (cm)	1.5 x (cm)	2 x (cm)
1	27	41	54	69	104	138
2	36	54	72	90	135	180
3	42	63	84	107	161	322
4	48	72	96	122	183	366
5	60	90	120	152	228	456
6	66	99	132	168	252	504
7	72	108	144	183	275	550

For those having trouble doing the math, that's an enclosure at least 9 feet (2.75 m) for an iguana 6 feet (1.83 m) long. Most small bedrooms are 9 feet across their width or length, so keep this in mind if you have been thinking that you can easily stash a green iguana in that empty living room corner or on top of your child's desk.

There are a few individuals and companies offering plans for large enclosures, or building large enclosures that can be shipped flat and assembled after delivery. Keep in mind that buying such an enclosure will be quite expensive in addition to the cost of shipping it. More information can be found at the Iguana Enclosure Plans page.

SUBSTRATE

When you go to a pet store or view an online herp supply catalog, you may be overwhelmed by the choices available to consumers. Fortunately, the decision is very easy: the majority of the substrates sold for pets, including are completely unsuitable for your iguana. This includes the ones with pictures of green iguanas on the packaging or in the company's advertising.

Unsafe and Unsuitable

Do not use walnut or corn cob, kitty litters of any kind, wood shavings, gravel, sand, "Calci-Sand", rock, pebbles, bark, "lizard litters", "iguana-approved bark" or any other particulate matter as substrate. No matter how closely you watch your iguana (keep in mind that you will not be watching them 24 hours a day, 7 days a week!), they will end up ingesting them, on purpose or accidentally.

These substrates can cause injury to the gut wall as they pass through the gut--*if* they pass through the gut. Too often they get stuck in the gut, causing an impaction (obstruction, blockage) which prevents food from passing through. The iguana stops eating, is unable to defecate, wastes build up in the system, and trapped food rots causing bacterial infections and gas. While this is going on, dehydration generally sets in as the body tries to move the mass. As the bolus of jammed food and substrate builds, it can perforate the gut, leading to emergency surgery (if the owner catches it in time and the iguana is still healthy enough to tolerate the surgery and anesthesia) or death.

Vets have pulled all of the above substrates out of iguana intestines, as well as strings from Astroturf that was never hemmed or trimmed or was allowed to begin unraveling. They have also removed, push pins, tacks, pennies, balloons, condoms, silk underwear, and human and dog hairballs. Some unlucky iguanas didn't survive the surgery to remove coins and other objects, including a Boy Scout pin with out its safety backing. I cannot stress enough just how important it is that *no particulate substrate* be used, and that you pick up after yourself and your kids. Iguanas are very much like human babies in that whatever they see that is new is very likely going to end up being licked and accidentally ingested, or ingested on purpose.

There is another problem caused by particulate substrates: they get stuck on sticky bits of iguana anatomy. When iguanas defecates, they often evert (stick out through the vent) cloacal tissue (males and females) or their hemipenes (males). Once the wastes have been forced out through the vent, the tissue is retracted. If the everted tissue comes into contact with particulate substrate, some of those particles can be dragged inside the body. This can be bad enough if the particles end up inside the cloaca. In males, small particles may become lodged in the grooves in their hemipenes. (If you've ever had a severe bladder infection or tried to pass a kidney stone, you'll have some idea of just how pleasant this isn't for your iguana.)

There is only one particulate substrate that could be considered safe, but it, too, is associated with health problems: alfalfa pellets. Alfalfa pellets are the only ones that are truly digestible - when they are broken down with water or the natural juices in the iguana's salad. If eaten dry, they may cause a problem, as they will draw on more fluid in the gut, which can cause dehydration or, since our iguanas are generally already somewhat dehydrated just from being kept outside their native range, increase their level of dehydration. If too many are ingested at one time, they may cause an impaction as they lodge in the gut, or injure the gut lining. The other problem with alfalfa pellets as substrate is that bacteria and molds will grow in the pellets dampened by food, spilled water, and urates. If you choose to use these pellets, you will need to thoroughly clean out the pellets when they are wetted to make sure you get all contaminated pellets out, and disinfect the enclosure to kill off the bacteria or mold growing on the floor of the tank under the pellets.

"But the product was made for iguanas…"

That doesn't mean the products were actually designed and marketed by people who care whether they are actually appropriate for your iguana--or any other reptile. Pet product manufacturers and pet stores are in business to make money. Magazines need advertising revenues to help keep subscription costs down yet still make a profit.

Why do manufacturers and pet stores continue to sell products that too many pet owners and reptile vets have found harmful? Because most owners don't complain when their pet has been traumatically injured or killed by them. I know several iguana owners whose iguanas have died, and many more whose iguanas have suffered terribly and then had to undergo major surgery to remove impacted substrates. Despite the owners' griping and complaining to me, however, they never bothered to put pen to paper to write a letter to the manufacturer or store.

A complaint form letter has been devised to help make the complaint and notification process a little easier. If your pet is harmed by a product that you presumed to be safe and appropriate for your reptile based on the marketing of that product, and you used the product according to the instructions or illustrations provided by the manufacturer or pet stores, please write them when your reptile is harmed or killed by it. If you can provide supporting documentation from your veterinarian, either a letter or operative report, all the better. If you and everyone else whose reptiles are harmed or killed by these products don't let these companies and businesses know every time it happens, nothing will change and more reptiles will needlessly suffer and die.

COMBINING IGUANA HEALTH AND SAFETY WITH HUMAN NEEDS

Choose a suitable substrate that is safe for the iguana and easy for you to clean. The latter is a criterion as the easier it is for you to clean, the more likely you will be to clean the enclosure every

time it needs to be cleaned. Since a healthy iguana who is being housed and fed properly defecates every day, that means you will be cleaning every day.

Hemmed artificial grass, indoor/outdoor carpeting, butcher's paper or paper towels can all be used. If using the artificial grass or carpeting, always have one or two pieces all ready to use in reserve. When a soiled piece is removed for washing and disinfecting, one of the spare pieces can be put into the tank. The disinfected piece must be completely dry before reusing. Be sure to trim any frayed edges and strings.

Newspapers should be avoided: the inks gets into the reptile's skin and the out-gassed fumes, undetectable by most people, when inhaled at close range by the iguana, may cause health problems. Many people tout newspapers as being the best to use because they are cheap and some of the chemicals in them have antibacterial properties. The problem with the latter rationale is that those chemicals don't disinfect piles of feces and urates nor do they disinfect the lizard when he walks through his wastes. Feces and urates shouldn't be left sitting around in an enclosure to begin with. It isn't healthy for iguanas (or other animals) or their humans.

My preference is for the easily cleaned and disinfected. Set up properly, your iguana will not be spending much time on the ground, coming down primarily to feed, drink and defecate (unless they do the latter from on high, shifting their vent off the branch and taking aim at the floor). In glass tanks, paper towels, terry cloth towels, bar/glass towels, or butcher paper may be used.

For wooden enclosures, I prefer to line the bottom with linoleum. You can buy reasonably priced self-adhesive squares in wonderful colors and patterns at home building supply and tile stores. Large pieces of remnant linoleum can be obtained relatively inexpensively from flooring stores and builder supply stores. The remnants can be cut to fit the floor and glued to the floor using an appropriate adhesive. The advantage of using linoleum remnants is that you can curve the piece several inches up along the walls, making rounded angles rather than an acute right angle where the floor and wall meet. This makes it much easier to thoroughly clean and disinfect as there are fewer sharp intersections and spaces for feces and urates to get into, and water spills don't come into contact with the wood of the walls.

MENTAL HEALTH

As mentioned above, we need to take into consideration not only our iguana's physical health, by providing the proper temperatures, day/night cycles, diet, etc., but we also must be concerned with aspects of their mental health and well-being.

PRIVACY

Young iguanas need a place to where they get out of the visual line of sight of anyone outside their enclosure. In the beginning, this also includes hiding away from you.

A half-log (available at pet stores) or an empty cardboard box work equally well. The box or log should be big enough for the iguana's entire body. The hiding place does not have to cover the entire length of the outstretched tail.

If you start off with a small log or box, you will need to replace it with larger ones as your iguana grows. As expensive as the half-logs and other manufactured caves are at pet stores, and as fast as iguanas grow, this makes recycling cardboard food and other such boxes an attractive, if not particularly aesthetic, alternative. Most iguanas outgrow their need for a hide box by the onset of sexual maturity (age 12 months). Once past that age, some iguana may need to hide during times of severe stress.

If you really want a more aesthetically pleasing hide box, you can cover your recycled cardboard box with a rainforest or jungle patterned contact or wrapping paper.

EXERCISE

Iguanas love to climb, so provide one or more branches for them to climb on to move from one area in their enclosure to another. Securely anchored ropes and terry towels are also suitable climbers for the iguana to climb and bask on. Heavy objects such as shelves and branches must be securely installed as well; if they fall, they may fall on top of the iguana, crushing or at least severely injuring him.

The impossibility of anchoring climbers is another major drawback when using glass tanks. There is no permanent way to affix shelves or secure branches and other climbers to the glass that will support the weight and activity of a growing iguana. Another is that, when you have all the things inside the tank that an iguana needs or want him to have, there is too little room left over for the iguana. Risk of injury to the iguana is increase when he tries to escape your hand and arm when you reach in to clean and service the enclosure and when you are trying catch the as-yet untamed iguana.

HEIGHT, HEIGHT, HEIGHT

Iguanas, especially juveniles and adults, feel more secure when they are up high. Expect your iguana to spend most of his time in the upper reaches of his enclosure. Make sure that it is safe and warm for him up there. This means keeping shorter enclosures several feet up off the floor so the iguana doesn't have to look *up* at anyone (including other household pets). Ideally, the top of the inside of the iguana enclosure should be at least 6 feet tall.

OTHER THINGS YOU NEED TO KNOW

The Boudoir

Iguanas like to sleep with their heads cushioned on something. In the wild, it may be another iguana. In captivity, it is usually something softer, that is, something without a sharp dorsal ridge.

Many iguana keepers find that their iguana likes a pillow. A sock stuffed with another sock, or a rolled up or folded-over towel, or a real pillow is a welcome addition to iguana sleeping and daytime lounging areas. Small pillows, even stuffed animals, may all be put to use. Free-roaming iguanas often seek out comfy couch cushions, or the pillows on your bed.

Provide your iguana with one or more pillows, but make sure that you can strip off and wash the covers as they do get soiled over time with food, water, poop, seminal deposits, and "snalt" from the iguana's sneezing and dribbling salt secretions

Treating Wild-Caught Wood

If you use branches collected from the wild, you will need to treat them first to assure that you do not introduce into your home any critters that belong outdoors. Trees and branches provide a home for loads of bugs, including wood-boring beetles, and spiders. You don't want them hatching in your iguana's enclosure--or your own areas, for that matter.

To treat the wood, you first clean off any dirt and loose bark.

If the branches are small enough to put in your oven, bake them at 200-250° F (94-120° C) for 2-3 hours. Let them cool completely.

If the branches are too big for the oven, place them in a tub of bleach-water solution (1/2 cup [118 ml] household bleach per gallon [3.8 L] of water). Soak the branches for 24 hours. Safely dispose of the solution, then refill the tub with fresh water, and soak the branches again for a day. Let them dry in the sun for 2-3 days before use.

If you need to, you can cut large branches into pieces to make them easier to clean and de-louse. You can then bolt them back together again. You can also assemble interesting and useful wood climbers by bolting together pieces of wood you have collected, rather than confining yourself to using the wood in the exact size or configuration in which you found it.

It is illegal to harvest (cut) wood, and it may even be illegal to collect fallen wood, in some state and national parks. Don't assume that just because the wood you want seems to be in a public area means it's free for the taking. Check with neighbors who may be pruning trees in the spring or fall, and keep an eye out for city or county crews working on trees lining the streets or in park.

LIGHTING

When it comes to reptiles, especially diurnal herbivorous reptiles, nothing's ever easy. Lighting is a prime example of "not easy". If you get it right, you will have a healthy iguana (well, assuming you get the diet and temperatures and all that other stuff right!). Get it wrong, and your iguana may end up with behavioral problems, increased incidence of illness, and broken bones.

The types of lighting you will be dealing with are those appropriate for daytime and for nighttime use, and those used to provide the ultraviolet B wavelengths that are critical for proper calcium metabolization. First, however, we will talk about the day/night cycles and their impact on health.

PHOTOPERIODS

Iguanas, like all other terrestrial vertebrates, operate on a daily cycle that includes a distinct dark period (night, also called scotophase) and light period (day, also called photophase). The two daily periods are generally referred to as "photoperiod".

In the tropics, the day light period is equal in length to the night dark period, both being 12 hours long. The farther north or south you get from the equator, seasonal changes: the days becoming shorter and nights longer in winter, with the opposite happening during the summer. Since our iguanas are tropical lizards, their daily photoperiod should be on a 12:12 photophase:scotophase cycle.

Why should you be concerned about the number of hours of dark and light your iguana is exposed to? Because if we do them wrong, the iguana's stress levels, immune and endocrine function, digestion, growth and development, breeding season behavior, and more will be adversely affected.

We know from research on many types of animals and humans that various neurochemical and endocrine processes take place during the dark of night, and that if there is no dark during that part of the brain's daily internal clock expects dark, these processes are disrupted. We also know that when onset of daylight is delayed, or the daylight period is abnormally shortened, that other types of disruptions occur, including sleep disorders that cause the same types of problems as delayed or abnormally shortened night periods.

Many iguana owners have school or work schedules such require them to be awake when most people are asleep, and sleep when most people are awake. While a human can chose to keep an altered day/night schedule and accept the health risks that go along with it, we cannot impose such schedules on our iguanas. Your iguana's daytime lights need to go on around 6 A.M., even if that is just when you are going to bed. Iguanas need to be fed in the mid-morning hours, even if that's your time to be asleep. In other words, you need to figure out ways to conform to *their* schedule, not force the iguanas to conform to yours.

There's stress, and then there's stress*!*

One of the things that must always be kept in mind is that just being in captivity is stressful and inherently risky to your iguana's health and longevity. If you intentionally impose long-term conditions that cause additional stress, then you need to rethink your having an iguana in your life. If your lifestyle (and schedule) ever changes so that you can meet an iguana's scheduling and other needs, then get yourself an iguana at that time.

Nighttime

Iguanas really don't need any lighting at night. That being said, the lights from heating pads, power strips, electrical outlet plug-in "night lights", and diffuse moonlight (or a street lamp) are acceptable and may in fact help them in case they are startled awake. Many an iguana owner has been awakened at night the sounds of thrashing preceded or followed by a thud, the unmistakable sound of an iguana body hitting a hard surface at some velocity. Iguanas, like other animals, may be disoriented if they are startled awake for some reason.

Iguanas usually need heating at night, though the nighttime temperatures are not as high as they are during the day. Because we cannot use white or other bright lighting at night due to how they disrupt the iguana's sleep function, we need to use sources of heat that produce no light or dim light. What you end up using will depend upon whether or not your iguana is free roaming or enclosed, the availability of multiple sleeping areas arrayed across a vertical and horizontal gradients, the time of year, and how the room and enclosure temperatures are affected by outside temperatures. You may need to use one or more heating devices in order to attain and maintain the nighttime thermal gradient iguanas require.

A space heater and lots of sleeping area options work for some iguanas. An infrared heating device, such as a ceramic heating element (CHE) or infrared panel, neither of which produce any visible light, may be best for enclosed iguana. Another option is a light bulb made specifically for nocturnal reptiles; they produce a very dim purplish light generally well tolerated by diurnal reptiles at night. Some people are able to find opaque red, green or blue incandescent light bulbs at regular lighting stores. These also produce very dim light.

If you do find these opaque bulbs or try a nocturnal bulb, you will need to try the different colors out to see which, if any, your iguana tolerates the best. Some do fine under the green or blue but not the red, for example. Signs of disturbance may include increased restlessness at night; drop in appetite; sluggishness during the day; crankiness; and other signs of being "out of sorts". These signs may take several days or even weeks to become apparent, so keep watching for such changes after you install one of these bulbs.

What about if you are using the same room at night for activities that require light? A little low ambient room lighting is probably okay (there have been no longitudinal studies on this aspect of their health at this point). Anything more than that should be avoided. That means if your iguana in a room where you normally have a bright light on until 10 PM or so, either the light or the iguana needs to move. Turning off the lights but having the television on can also be disturbing as the eyes and parietal eye detect the flickering light even when the iguana is resting with his eyes closed or is asleep.

If your iguana is housed in an enclosure, you may be able to cover the front and sides of the enclosure with an opaque, light-blocking fabric. This will enable you to have light on in that room. A dark fabric color blocks more light than a pale one.

Remember to make sure that any such cover is safe: if the iguana's heat lamp comes into close contact (or proximity) with the fabric cover, the fabric may catch on fire. The same is true if the fabric cover is close to the daytime lights. If you oversleep and don't get the cover removed before the automated daytime lights come on, you could be in for a rude awakening. Fire safety can't be stressed enough when it comes to any pet, but is of special concern when it comes to reptiles in general, and iguanas in particular, because of all the heating and lighting equipment they require. There have been far more home and school fires caused by iguanas actively trying to break out of their enclosures or knocking over poorly mounted, easily accessible light fixtures than fires caused by the activities of other reptiles.

Regular Daytime Lighting

Iguanas need bright (not glaring) white light, starting early in the morning. As with humans, early morning light keeps the circadian clock running on time. The endocrine and other systems depend on this light to help keep them running on time. The light also enables the iguana to better visualize their environment.

Iguanas, like many animals, can see some of the wavelengths in the ultraviolet A range. This affects how they see colors and enables them to see more color gradations than we humans do. Ultraviolet A (UVA) light appears to make their food seem more attractive or appetizing.

Fortunately, providing ultraviolet A is quite simple: any household incandescent light bulb provides some along with providing visible light and heat. Ultraviolet B-producing fluorescent tubes also provide UVA.

There are light bulbs made specifically to provide captive reptiles with heat and visible light. They are more expensive than household incandescent bulbs despite not doing much more for the reptiles than do household incandescents.

Some of the made-for-reptile lights are "color-corrected", that is, tinted to reduce or block the passage of certain visible wavelengths (color) through the glass of the bulb. This does more for the human looking at the reptile, however, than it does for the reptiles themselves.

The lights that produce the heat needed for basking and helping to establish and maintain the daytime thermal gradient is referred to as a "basking" light.

Ongoing Costs of Iguana Care

As you purchase iguana supplies throughout the year to replace things as they are used up, worn out, or break, you will come to appreciate the fact that there are some less expensive alternatives to made-for-reptile products. The products made for humans often not only work as well, but also are safer as they must meet much more stringent quality and safety requirements.

There are some made-for-reptile products have no alternatives, such as the UVB-producing fluorescents (see below) or some of the infrared heating devices. The money you save by buying the household incandescents, human heating pads, human vitamins, etc., will help offset the cost of the more expensive reptile products and set some money aside for upcoming veterinary visits and buying fresh out-of-season produce.

Ultraviolet B

Ultraviolet B triggers a chemical reaction in the skin that ultimately results in the body's formation of vitamin D3. Without sufficient D3, iguanas cannot metabolize enough calcium to keep their cells functioning and bones strong.

Humans can utilize exogenous D3, such as that found in multivitamin products and fortified milk just as efficiently as we make it in our bodies if we get adequate sun exposure. This ability to utilize oral forms of D3 has been an important health factor as the Industrial Age resulted in so many humans spending far more time indoors than they had previously. The ability to use oral D3 has also helped those who live in the far north (and south) were there is too little UVB penetration through the atmosphere during the winter months that those not taking D3 supplements experience progressive bone loss during the that time. This entire process and some of the endocrine research is discussed at some length in other articles. For now, the most important thing to know is that, unlike humans, some research suggests that iguanas are unable to use efficiently metabolize oral D3 as a total replacement for regular exposure to UVB.

What that means to iguana owners is that if we cannot get our iguanas exposed to enough natural (not filtered through glass or plastic) sunlight throughout the year to enable them to develop the D3 they require, then we need to supply the UVB through safe artificial means.

How much UVB does your iguana need? "Sufficient UVB" is defined as being the amount of daily exposure to that part of the UVB range (280-315 nm) that is responsible for triggering the formation of pre-vitamin D in the skin. Only the wavelengths between 280-315 nanometers promote the production of D3 out of the entire UVB range of 280-390 nm.

Just how much sun exposure your iguana requires varies depending on where you live, the day of the year, and the time of day, and the country and habitat from which your iguana (or his imported parents) came. Even knowing all of that, it would be difficult to say how much your iguana needs since there hasn't been any research to document exactly how much exposure of the specific UVB-inducing wavelengths within the UVB range will result in sufficient D3 production

on a daily or aggregate basis. So, how can you make sure your iguana is getting enough UVB exposure? Install an ultraviolet B-producing fluorescent in his enclosure.

UVB-Producing Fluorescents

The two best UVB-producing fluorescents are Duro-Test's Vita-Lite®, and Zoo Med's Iguana Light® or Repti-Light® (Zoo Med's two products are identical except for the name and the packaging, so can be used interchangeably for iguanas or other reptiles requiring UVB). They consistently produce sufficient ultraviolet B. They also have a color rendering index (CRI) of at least 90 and so contribute to the more natural bright, rather than glaring, light in the enclosure or free-roamer's basking area.

To be effective, UVB-producing fluorescent lights must be no farther than 18 inches from the iguana; no more than 10 inches away is better. The amount of UVB disperses very rapidly over distance, so any farther away than this and your iguana will not get enough UVB. This is another reason why tall narrow enclosures are inappropriate for iguanas: they end up with maybe their head and neck being close enough to the UVB, but the majority of their skin--on their body and tail--is too far away and so they do not get enough UVB.

Install the UVB-producing fluorescent on the same side of the enclosure as the basking light. Your iguana is going to spend most of his daytime in the warm/hot area of his enclosure. If you place the UVB fixture on the cool end, he will be too far away from it.

Make sure that the fluorescent fixture is firmly attached to the roof of the enclosure and that the iguana cannot climb up into it. A yearling iguana is big enough to unseat the tube and bring it crashing down, throwing glass splinters and fragments all over the enclosure--and the iguana. You can cut a piece of hardware cloth (1/4- to 1/2-inch gauge) to fit just inside the rim of the light fixture. If you find your iguana constantly trying to get into the light fixture, or clinging to the mesh protecting the light, then you are probably keeping the enclosure too cool.

The UVB-producing fluorescent light should be on a 12-hour on/12-hour off schedule for most of the year. Plugging the light fixture into a household appliance timer makes this very easy: set the light to go on at 6 a.m., and off at 6 p.m. If you wish to have your iguana a little more awake when you come home from work, you can set it to go on at 7-7:30 a.m., off again at 7-7:30 p.m. A 12-hour on/12-hour off photoperiod should be kept during the winter to assure that the iguana is receiving enough UV radiation to continue to synthesize D3.

If in addition to the UVB fluorescent your iguana is also spending a couple hours outdoors every week during the late spring and summer months, he may be getting enough UVB, in combination with the fluorescent, to be able to turn the fluorescent on later and off earlier every day. The same holds true for free roaming iguanas if you are safely able to leave a window open during from 10 AM to 2 PM several days a week during as much of the year that you can. The only way to know for sure whether your iguana is getting enough UVB to metabolize sufficient calcium is to get him checked regularly by the reptile vet. Once you know for sure that your UVB routine is working, you can then go to doing annual blood tests to monitor this aspect of your iguana's health.

Because iguanas are particularly restless--and persistent--during breeding season, unless you are using strong screens and reinforce them with kick/puppy guards too small for the iguana to squeeze through, keep your windows closed during breeding season when you can't closely supervise their activities.

If your iguana is a female, you will need to get her checked when she starts her annual breeding season (starting at age 18 months) to ensure she has enough calcium and is metabolizing it enough to keep herself healthy *and* to produce viable, properly shelled eggs. Please read the Preparing for Egging and Incubation article before she turns 18 months of age to find out more about this aspect of your female's life. Be sure to have your favorite comfort food or beverage on hand before you sit down to read this article: you are going to need it.

Cautions

The lights made for fish, reef tanks, and plants, do not produce the ultraviolet and some of the visible wavelengths required by reptiles. Incandescent lights, including those made with

neodymium, "rare earth phosphor" and other basking and heating lights marketed specifically for reptiles, do not produce the necessary UV radiation and should only be used to provide heat.

The words "full-spectrum" on the package do not mean the light produces the necessary UVB; in fact, the product may not provide any UVB at all! There are no "truth in advertising" laws regulating the pet care supply industry, nor any requirements or limitations on what words may be used for what purposes. As a result, there is an incredible amount of deception occurring in the industry and has been for years as a result of the booming trade in reptiles.

Safety Issues

The UV radiation emitted by the UVB-producing fluorescents eventually degrades to the point of emitting too little for your iguana. This occurs long before the fluorescent tube burns out and stops emitting visible light. Therefore, it is critical that you replace your UVB tube at least once a year. Some owners replace them as soon as black bands appear around the ends of the glass tubes, something that may happen before the year is over. Some ultra-conservative iguana keepers replace their tubes every six months, but this has not proved to be necessary for iguanas.

If some is good, is more better?

Some people believe that, if some UVB is good for their iguanas, then more must be even better. They seek out very high output UVB products such as tanning lamps, phototherapy lamps, and mercury vapor lamps. The latter are particularly attractive because they produce heat as well as UVB and can be screwed into a regular incandescent light fixture.

Tanning lamps--the UVB tubes and lights used to tan human skin--are dangerous for humans. Enough UVB and UVA can pass through the glass or plastic of your iguana's enclosure to cause health problems for you. Since iguanas are not exposed to such high levels of UVB in the wild, they are at risk for some of the say health problems as humans are, including those affecting the eyes and immune system.

The mercury vapor lamps made for animals are also very high output and so dangerous for humans and potentially for iguanas and other animals, for the reasons stated above. In addition, if the casings crack but the light still functions, owners don't realize that they are being exposed to toxic mercury vapors.

Since these mercury vapor products are not made for humans to use and are not considered to be "veterinary devices", they have fallen into a regulatory black hole. Damage to eyes and skin (including cancer), as well as autoimmune disease, are some of the most common health problems associated with regular UVA and UVB exposure in humans and animals. For more information, please read the articles on ultraviolet light and mercury vapor lamps on the Captive Environment page.

Overwhelmed?

Most iguana owners come to realize that the issue of UVB lighting is one of the most complex and confusing areas of iguana keeping. The UVB subject is second only to diet in being rife with misinformation, misinterpretation, and some controversy.

Please take the time to read the available articles at my site and several federal sites to get further information on this issue. Discussing your questions with other knowledgeable iguana owners can help clarify some points and figure out ways to best set up the light fixtures in your particular situation. Over time, the mists will clear and this will all become second nature to you, and you will find that you are the one helping others.

HEATING

Each reptile species has a thermal range they evolved in or to which the species adapted over tens of thousands or millions of years as global environmental changes occurred. This range has a maximum low temperature and maximum high temperature in which the species's body

functions most efficiently. While a healthy reptile is, for a short period of time, able to tolerate temperatures slightly below or above these maximums, if they are forced to remain at abnormal temperatures for too long they will eventually develop serious health problems.

The growth of an otherwise healthy iguana is based on these four elements: temperatures (heat), lighting, activity, and diet. The warmer they are (and over 95° F/35° C is *too* warm), the more active they will be. The right temperatures at the right time means their metabolic rate will be where it should be help ensure their food is being processed properly. Other biological factors are temperature dependent, such as immune system function, so more than just digestion is at stake. Kept at the right temperatures on the right schedule, your iguana, like his wild cousins, will eat every day (with a few exceptions) and poop every day (poop being the technical term for voiding feces and urates).

Iguanas kept at below-optimum temperatures eat less, are less active and, being under increased stress due to the inappropriate environmental conditions, are more susceptible to illness and nutritional disorders. Many pet stores--and not a few reptile pet owners--think it is okay to keep their reptiles at temperatures below those the species require for health. They use the low temperatures as a way to make the reptile easier to handle, save on food and/or to slow or limit the reptile's growth. This is a cruel and inhumane practice and should not be used for these or any other reasons, by pet owners or pet stores.

So, too, will providing only part of their required thermal gradient, or providing no gradient, as happens in enclosures that are too small to establish the necessary horizontal gradient or when the owner doesn't understand the importance of providing the required gradient. Worse are those owners who just can't be bothered. Because iguanas and other reptiles can live and appear to function for long periods of time when kept inappropriately, many people do not believe that they are doing harm to their pets because the eventually fatal health problems may take so long to manifest. As a reminder, then: we must create an independent environment for our iguanas, regardless of the ambient room air or outside temperatures, and that independent environment must provide the daily temperature ranges the species requires, with the corresponding nightly drops.

Despite the fact that iguanas are tropical animals and have tropical temperature requirements, in captivity they are frequently kept in subnormal temperatures. While a room (or enclosure) in the mid 80s F (26-27° C) may feel very warm to us, it isn't even warm enough to get the iguana's digestive system to start working on properly digesting his food.

Daytime Basking Area

To properly stimulate appetite and digestion, iguanas must have access to a basking area that remains between 88-95° F (31-35° C) during the day time hours. They must be able to comfortably fit their entire body and most of their tail into this basking area. During this period of time, the rest of their enclosure must sustain the iguana-specific daytime thermal gradient.

Daytime Thermal Gradient

For all iguanas, the daytime gradient is 75-88° F (24-31° C),

Nighttime Thermal Gradient

While adults (18 months old and at least 9 inches snout-vent length) can tolerate nighttime drops to 70° F (22° C), for hatchlings and subadults, the lowest temperature should not fall below 73° F (23° C). The maximum on the warm side is 84° F (28.8° C).

When nighttime temperatures are within the proper range, young iguanas will often wake during the night and eat some more food. This not only increases the amount of exercise your iguana gets, but also the amount of food it eats. The increased caloric intake can also help compensate for the extra calories burned by nervous new iguanas.

Iguanas getting ready to shed may select cooler areas in which to sleep. Iguanas suffering from acute stress or illness may also select cooler areas.

You can provide lower low-end temperatures at night--and day--so long as the required temperatures are also provided. Increasing an iguanas options to a limited extent, is okay so long as the species's requirement is available and of appropriate size for their overall length and mass.

If they're so smart, how can they be so dumb…?

Temperatures can get too hot or too cold for iguanas. They can die from hyperthermia and from hypothermia.

Overheated iguanas sometimes fail to move themselves to a cooler part of their gradient; why this happens no one knows. It may be due to the fact that since it doesn't get too hot for them in the wild, these essentially still wild lizards haven't figured out that too hot is dangerous, so it doesn't occur to them to move. It is up to you to make sure their enclosures or areas do not exceed 95° F.

Iguanas, like dogs, don't sweat. The only way they can try to cool down on a too-hot day is to pant. The moisture evaporating from the tissues inside their mouth lowers the temperature--by a too tiny amount--of the blood circulating in the tongue and tissues. Since the rest of the body is still overheated, that blood is rapidly heated up again, so unless the iguana is cooled down by being sprayed with tepid water and moved into a cooler area, overheating could become deadly.

Sick or stressed iguanas frequently seek out a colder-than-normal place to hide or sleep. What may happen is that if they get too cold, or the ambient temperature where they are drops even further, they may become too cold to move back to their usual area. If you don't move them yourself, they will eventually die of hypothermia. Hypothermic iguanas cannot be put right into their basking area: that, too, may be deadly. Please read the article on Hypothermia to find out what to do it this happens to your iguana.

Equipment to Avoid

In the wild, iguanas are warmed by radiant heat: the tropical sun warms up the air. Resting on branches, the iguanas are bathed in the heat that is available to them wherever they move around in their environment. When they are exposed to the sun, they get warmer; when they move into the shade, they cool off. This is called thermoregulating and is how all reptiles regulate their internal body temperature.

Despite the advertisements showing iguanas happily draped across hot rocks and heated "branches," these products are not suitable for iguanas. Hot rock and sizzle stone manufacturers have jumped on the iguana bandwagon, sticking iguanas in ads for all their products (well, it seems like all of their products!) whether or not that product is suitable for iguanas. Hot rocks and sizzle stones do not heat up anything but themselves and what ever happens to be plastered to them. All too often, their internal temperature regulator fails, and the rock becomes hot enough to severely burn the iguana, sometimes fatally. This includes all of the "new and improved" models that seem to keep coming out every year. (My question is: if the previous model was so "new and improved," why does the manufacturer feel he has to come out with yet another "new and improved" model?)

Many hot-rock using iguana owners insist that their iguanas "love" their hot rocks. The fact that the rest of the iguana's enclosure is too cool for their iguana doesn't occur to them or they decide it doesn't matter. Most of these owners are just going by what the pet store--or, unfortunately, some outdated veterinarians--told them. Of course, the pet stores and hot rock/sizzle stone manufacturers love it: once you buy the rock and use it, there's no returning it!

The reptile veterinary and the better pet trade literature has for years said that hot rocks should not be used for iguanas (Mattison, 1987; Frye, 1991; de Vosjoli, 1992; and Blair, 1993, to name a few). Despite this, pet stores and pet product manufacturers still push them on new iguana owners, and reptile magazines continue to accept advertising depicting inappropriate use.

Heated branches have not (that I have yet heard) been guilty of causing thermal burns as have hot rocks. Branches, like rocks, do not heat up the environment, and so are unable to provide the type of environment required by the iguana. They are also expensive and your iguana will outgrow it rather soon if you are caring for it properly.

Another product promoted by product manufacturers and pet stores is undertank heating pads made for reptiles. These pads that have a self-adhesive backing and are to be glued to the underside of glass tanks. While this may be suitable for a small terrestrial reptile that will not be outgrowing its tank, it is needlessly expensive for iguana owners. The pads are not designed to be removed from the glass, and could pose a danger if they are removed and reused under or inside a larger tank.

Effective Heating Equipment

Iguanas in warm-to-hot climates generally do well with a heating pad made for humans. Placed under one-half of the tank or in the basking area of a larger enclosure, this may be all the heat needed to attain and maintain the basking temperatures in that area of the enclosure during the warmest summer months (always use thermometers to check this, however). Warm air rises but it also dissipates in a large area, so a heating pad at the bottom of a 9 ft W x 3 ft D x 6 ft H enclosure isn't going to do much. Putting that pad in the basking area will.

DAYTIME HEATING

Most iguana keepers live outside the tropic zone, in places where the air temperatures do not reach--or may seasonally exceed--those in the tropics. They must rely in full or in part on household incandescent bulbs or properly installed ceramic heating elements, as discussed above, to provide the daytime temperature gradient iguanas require.

While UVB-producing fluorescent lights produce a little heat, it is not enough to provide the required temperatures for green iguanas. Fluorescent fixtures, when more than one is installed, or the tank is very small, or there is a heatwave going on, may make a somewhat larger contribution to the heating, but you will need to plan on using other heating devices to attain and maintain the necessary daytime temperature gradient.

NIGHTTIME HEATING

As discussed above, the lower temperatures required at night can often be maintained by use of a heating pad and infrared or dim incandescent bulb. If a space heater is used to heat the room and enclosure to the nighttime thermal gradient, no other heating devices for the iguana may be necessary. Take advantage of warm air rising and make sure your free roaming or enclosed iguana has a choice of elevated sleeping areas available to him.

As seasons change and nights get colder or warmer, you will need to monitor the actual temperatures in your iguana's sleeping area to make sure the nighttime gradient is met and maintained. For iguanas, being too hot at night is just as unhealthy as being too cold.

CERAMIC HEATING ELEMENTS (CHE)

Ceramic heating elements produce heat by emitting infrared wavelengths. They produce no visible light (which can make it difficult to tell if they are turned on or not). They are very useful in smaller enclosures because the bouncing wavelengths ultimately warm up the tank and you can establish a horizontal and vertical thermal gradient. In large enclosures, they are only useful to provide the basking area heat. They can also be used in outdoor enclosures in the basking area.

The CHEs get hot--very hot. Hot enough to melt the plastic sockets on many of the clamp-style incandescent light fixtures used by so many reptile keepers and that may be built into some wood or melamine enclosures. You must use porcelain light sockets if you are going to use a CHE.

CHEs produce a cone-shaped zone of heat. The apex (smallest end) of the cone is the bottom edge of the CHE. The broadest part, or bottom, of the cone is about 15 inches (38 cm) across. If the iguana laying at the bottom of this cone, your iguana will need to be 8 inches (20 cm) from a 60 watt CHE, 10 in. from a 75 watt CHE, 12 in. from a 100 watt CHE, etc.. The farther

away from this cone or area of heat produced by the infrared emitted by the CHE, the more rapidly the heat dissipates.

In a small enclosure, the infrared waves bounce off the solid surfaces of the enclosure and so the enclosure will get much warmer than the same CHE used will in a larger enclosure. As a result, in large indoor enclosures and in outdoor enclosures, CHEs are best used for focal heat rather than the main heat source.

More overall space can be heated up by using a large infrared pad or panel which, depending on the type, may be mounted on the floor, a shelf, or sideways on a wall. You can find these sold by some online herp suppliers and farm and ranch suppliers, or may be ordered through your local farm and ranch stores. When ordering from farm and ranch suppliers, ask for "farrowing pads" or "pig blankets".

REGULATING THE HEAT

If it gets too hot, you can plug the light, CHE or infrared panel into a lamp dimmer switch, using that switch to raise and lower the light (heat output) as needed to regulate the degree of warmth provided.

In winter, a thermostatically controlled UL-approved room heater (preferably equipped with an automatic tip-over shut-off and audible alarm) may be used to keep temperatures in the optimum range. One that has proved to be safe, economical and sturdy is a closed-system, radiant oil heater. Looking rather like a freestanding radiator, you can adjust the output from 600-1500 watts. They roll easily yet do not easily tip over; they do not have tip-over alarm, but they are more difficult to tip over than other smaller room and space heaters. In a closed room, these radiant oil heaters will usually keep the room air temperature in the upper 70s-low 80s, making it easier to keep your iguana's enclosure as warm as it needs to be at night.

Depending on the season you may also need one or two light bulbs or light bulb and CHE to meet and maintain the daytime basking temperatures in the basking area.

Human heating pads on the shelves may be able to make the same contribution as light bulbs and CHEs. If heating pads do boost the heat sufficiently, they have an added benefit in that, if they fall on the ground, they won't start a fire or break.

THINK 3D

A key factor overlooked by many iguana owners is that the iguana lives in a three dimensional environment. We need to provide at least a two-dimensional thermal gradient. The horizontal warm-to-cool gradient runs from one side of the enclosure or area to the other, across the width of the area. The second dimension is the vertical gradient, from the top of the enclosure or area to the bottom. In an enclosure or area that is deep enough, a third dimension can also be provided, from front to back.

Due to their preference for basking in high and sleeping in high places, the basking area is best placed near the top of the enclosure or area towards one side. The heat will dissipate as it spreads down and across the enclosure or area.

NO GUESSING ALLOWED

One thing I have learned is that it is impossible for us mammals to accurately guess what the temperature is in a reptile's enclosure or area. There are, however, a variety of thermometers that will take the guesswork out of assuring that your iguana's temperature gradients are being attained and maintained.

Most pet stores sell different thermometers. The ones for fish don't go as high as those made for reptiles. Species not native to the deserts need thermometers that read up to 105° F (40.5° C); they must also go down at least into the 60s, if not 50s. There are different types, such as self-adhesive ones (that tend to have a higher degree of error and short lifespan). Others are made to be mounted inside the enclosure or area, or have multiple thermosensing probes that are connected to a device that displays the readings.

Any regular thermometer can be securely taped to the enclosure. These basic thermometers are often found at biological supply houses and hardware or homebuilders supply stores. Make sure the iguana cannot get at filled glass thermometers as they can all too easily claw them loose. When the thermometer breaks as it hits the ground, the iguana may end up accidentally or intentionally ingest pieces of it.

You need to get at least two thermometers, one for the cool side and one for the warm. Ideally, you should have a third one at the basking area.

The thermometers must be placed at the same level as the iguana's regular basking and sleep areas. Putting a thermometer several inches above the area will give you a reading that could be quite different than the temperature where the iguana actually spends its time. Placing a fourth thermometer in the room itself will give you an idea, over a period of time, of how changes in the room air temperature affects the temperatures inside the iguana enclosure.

Location, Location, Location: Part II

The placement of the enclosure within a room and inside the house can also affect how well the enclosure heats up or retains heat. If placed on the floor or in a part of the house that stays cool even during hot weather, you are going to have to pump more electricity into that enclosure or area to be able to attain and maintain proper temperatures.

Placing the enclosure or free-roaming area in the hottest part of the house may also be a problem if that room or area gets very hot during the summers. As the highest a self-adhesive thermometer goes is 105° F, if your self-adhesive thermometer is reading 105° F, it may well be much hotter than that in there, hot enough to cause your iguana severe problems, including fatal hyperthermia.

Iguana owners who are not electrically challenged (or knows someone who isn't) can wire the heating equipment directly into a thermostat and then program the daily temperature changes and maintain them automatically. For the electrically challenged, there are devices that you can aim at an area and get a reading of the temperature.

PART 3: FOOD SELECTION

For years, pet trade books and many veterinary articles stated that iguanas were omnivores, consuming both animal and plant matter. While there have been some observations of some individuals eating insects and carrion, most have occurred in places where iguanas have colonized non-native habitats, or in highly disturbed native habitats. Long term research into many different wild populations has shown that this is not a species-wide behavior in green iguanas in their native habitats.

The literature that states that iguanas are omnivores part or all of their lives seems to all be based on something written by someone who misread or misinterpreted one sentence in a 1950 issue of a herpetology journal. That one error has led to decades of misinformation and confusion and condemned 50+ years of pet and zoo iguanas to deadly diets.

It appears these authors, which included some biologists, veterinarians, and pet care book writers, all referred to earlier sources for their statements regarding iguanas-as-omnivores. Trace these sources back far enough, and you come to the journal article written by P.L. Swanson back in 1950: The iguana *Iguana iguana iguana* (L.), in *Herpetologica* 6(7):187-193.

The only sentence in Swanson that refers to juveniles is: "Very young iguanas are probably almost entirely insectivorous*, but I have made no personal observations on their feeding habits.*" [emphasis mine] For further information and analysis on why we should not be feeding any animal protein to our iguanas, please read the excellent article on this subject by zoologist Adam Britton.

Wild Iguana Studies

According to Thomas Boyer (*Journal of Small Exotic Animal Medicine* 1(1)), Gordon Rodda (*Herpetological Review,* 25(2):85), John Iverson (Adaptations to Herbivory in Iguanine Lizards),

and other biologists who have spent decades researching wild iguanas, iguanas are folivores (leaf eaters). Iverson found, in his study of the intestinal contents of iguanas of all ages, that despite previous reports of their insectivorous and carnivorous natures as juveniles, green iguanas are in fact herbivorous from their very first meal. Though they may occasionally ingest bits of carrion or an insect perched on a leaf, this animal protein consumption is accidental--it is not a conscious dietary choice. Accidental ingestion is low--if you were a bug, would you remain on the leaf you are on when it starts shaking and a large animal was bearing down on you?

Along with looking at gut contents, Iverson also compared the cecum (hindgut) of many different types of lizards, looking at the cecum's structure as well as at the types of gut organisms found living in the cecum. He found that the iguana digestive system, like those of the other strictly herbivorous lizards, is structured to process a high-fiber herbivorous, not omnivorous, diet and to extract much (but not all) of their water needs from the foods they eat.

Food Iguana Studies

During the 1980s, Dagmar Werrner and others conducted research into ways to breed and feed iguanas to more rapidly bring them to a size where they are big enough to eat.
They found that when they added some animal protein to the food they were feeding their hatchling iguanas, the hatchlings grew more rapidly. This was good news for the study and the conservation programs that led to and resulted from these studies. This rapid growth meant that the hatchlings fed animal protein grew faster and so were at less risk of being preyed upon, which meant there were more of them around for the families who would eventually raise these hatchlings to eat.

The idea was to conserve forests by not cutting them down to build the much larger enclosures required for poultry. Instead, much smaller structures could be used to protect the rapidly growing hatchlings until they were big enough to be set loose around the family's home. The iguanas would then live in the trees and eat the foliage. To entice the iguanas to stay in the vicinity, the people provide food--the same or similar to what they iguanas were fed as hatchlings--in elevated feeding stations. When the iguanas are big enough, they are harvested as needed for food. (For more information on the use of farming to conserve both animal and plant resources, please visit the Costa Rica: Iguana Park website and read Sorrel Downer's Survival of the Tastiest.)

While forest conservation and this type of iguana "farming" (which is not the "farming" done to provide hatchlings for the international pet trade) is good news for both the forests and the families, it has created problems for pet iguanas. The pet product manufacturers who jumped on the reptile bandwagon based their commercial iguana diets on this conservation research, resulting in commercial food products containing animal protein being made specifically for pet green iguanas. The fact that the conservation diet was developed not to produce healthy long-lived iguanas but to grow and food iguanas fast apparently didn't matter to these companies.

During this time, the pet trade books and magazine articles continued to recommend diets containing marginally nutritious greens and plants known to cause other types of health problems, such as oxalate and goitrogens. And they all recommended animal protein: insects, mice, cat food, dog food, chicken, beef, mammalian pet and zoo carnivore foods, eggs, etc.

As the popularity of iguanas as pets exploded in the U.S. the early 1990's, the trend spread into Canada, Northern Europe, and Japan. Feeding on this iguana frenzy were the pet trade book publishers who found new markets for the same old, outdated and inaccurate books. Sometimes the books were "updated" by slapping on new cover art or new photos, but the information in them was identical to the book as it was originally published--with some books going back to the 1950s and 1960s! Whether remaindered books were pulled out of a warehouse somewhere, writers were contracted to write new books, with a couple of exceptions, the books of the 1980s and 1990s essentially rehashed the same misinformation in the earlier books.

The mainstream veterinary literature during these decades followed the pet trade book publishers in that the published articles recommended the same poor diet, health and behavior information. In the early 1990s, however, some vets started bucking this trend. As these clinical and research veterinarians started taking a closer look at both the field research on wild iguanas

and documenting what they were finding in their practices and laboratories, they began to break away from the mainstream and exotic veterinary medicine. They created a reptile and amphibian veterinarians association and began publishing a periodical bulletin that grew from a few articles by a few vets into an journal reflecting the work of dozens of vets and researchers, an annual conference and impressive proceedings.

By 1993-1994, these vets started recommending that no animal protein at all be fed to green iguanas. Some of their names may be familiar to those who read herp magazine, herp society, and veterinary journal articles: Thomas Boyer, Stephen Barten and Stephen Divers are but a few.

While understanding that wild iguanas may occasionally end up eating a bug or two, the vets came to the conclusion that no animal protein should be included in the iguana diet because they could determine no amount that was safe, long-term, for the iguanas. Whether it was the animal protein by itself, or the animal protein in conjunction with other deleterious effects of factors related to being captivity, iguanas were dying from kidney failure at relatively young ages, despite improvements in other aspects of their care.

Another factor was that iguanas fed a properly constructed plant diet did just fine, growing and developing normally without any animal protein in their diet. They lived longer, too. Instead of dying around 5-7 years of age, as did iguanas fed animal protein, the iguanas fed a proper plant diet were living to 10+ years of age. That's still young for green iguanas, but with the animal protein variable out of the way, by the later 1990s, these reptile vets and researchers were able to start looking at other captivity factors that affect the long-term health and survival of pet iguanas.

Also new in the 1990s was the formal research in the nutritional requirements of captive zoo and pet iguanas. Their findings, too, continues to support a diet free of animal protein and caution regarding those plant foods that interfere with the metabolization of nutrients.

Why is animal-based protein such a problem?

Among many other things, plants and animals contain an array of up to 22 known amino acids. The presence of any given amino acid varies and, when present, they are present in different amounts. To make things more interesting, how aminos are deconstructed and utilized by the body differs depending upon whether the source of the aminos was a plant or an animal.

Carnivores are specifically adapted to eating animal protein and will do poorly on a vegetarian diet. Omnivores are specifically adapted to eating a combination of plant and animal matter, with the ratio of plant to animal matter varying across species. This means, for example, that a species whose diet should be 80 percent animal matter and 20 percent plant will do poorly when fed a diet that is 20 percent animal and 80 percent plant. Herbivores, such as green iguanas, are specially adapted to consuming only plant matter.

Generally speaking, plants form pyrimidines, animal protein forms purines. The more purines in the diet, the higher the strain on the kidneys, and the faster they will fail. So, instead of supporting the iguana for 15-20 years or so, the kidneys fail much sooner, leading to a rapid, stressful--and distressing--death. It should be noted that some plants form purines, most notably whole grain cereals (such as wheat cereals and breads), mushroom and beans. Some plant-based purines may be tolerable as long as the overall selection of plants eating is varied and they comprise a small part of the total diet.

Another animal protein-related problem is that animal protein is high in fat. High fat diets are not only bad for the arteries, they are hard on the liver and impair calcium metabolism. Herbivorous reptile diets should contain no more than 10-12 percent fat. Two beans, soy and garbanzo (chick pea), are both high in fat and so should not be fed on a regular basis. Soy products, including regular and low fat tofu, also contain goitrogens, so soy in any form should be restricted to occasional use only.

Yet another problem may be caused the efficiency of the iguana hindgut. Research in the lab and in the field has already documented how efficient the green iguana gut is in digesting its food and extracting nutrients. The iguana gut evolved to break down tough plant material. Plants have both a cell membrane and a tough cell wall; animal cells have only cell membranes. Iguanas, under optimum conditions, can extract 40% of the nutrients from the plant food they eat, making

them one of the most efficient herbivores, topping even rabbits in this regard. Given this extremely efficient gut, iguanas may be breaking down more animal matter into bioavailable components than they can do with plant matter, thus making more animal protein (and fats) available than they would eating the same quantity of plant material. (More information on gut function and digestion can be found in the book, Iguanas of the World, referenced in the Iguana Bibliography and Suggested Reading.)

Another factor of growing concern that affects long-term kidney function is that, in captivity, it is virtually impossible for iguana owners keeping iguanas at home, in their office, or at school, to provide the high humidity in which wild iguanas live. Most green iguanas come from areas where the air is saturated with moisture. It is difficult to provide this level of humidity in captivity without fostering the growth of molds and damaging the structural materials in the iguana's enclosure, and the furnishings in rooms in which free-roamers live.

Lastly, animal protein creates more nitrogenous waste than do plant protein, wastes that must be processed by the kidneys. The higher the excreted nitrogen load, the more stress there is on the kidneys. The higher the stress on the kidneys, more certain is the early onset of kidney failure.

Assessing Information

Despite all of the above having been published, as research in journals, chapters in biology and veterinary medical books, and in the best of the recently published new iguana care books, bad information is still being published. Pet book publishers are still publishing books that recommend foods such as monkey biscuits, primate, trout, carnivore and omnivore chows, chicken, beef, other animal flesh, dairy products, eggs, worms, mice, crickets, cat food, and dog food. Many websites, both personal homepages and those created and maintained by pet information content providers, are publishing incorrect diet information.

Some books and sites include other inaccurate information, such as stating that bird gravel being necessary for digestion. Not only is gravel completely unnecessary, it is dangerous as the gravel will cause internal injuries and serious, if not fatal, impactions (see the section on Substrates above).

Perhaps more disturbing are the iguana care sites that attack diets whose plant protein content is comparable to that of the plant proteins consumed by wild iguanas. What seems to be lost or not factored in by the individuals writing for those sites is that they do not seem to understand the difference between animal protein and plant protein, purines and pyrimidines, or the issue of nitrogenous waste. [7]

How to assess the quality of the information you read? With books, look at the publication dates and at the diet information. As a general rule, if the diet information is outdated, some of the other information is inaccurate as well. Until you know enough to be able to filter out the inaccurate information, do some more research to determine what's right and what's not. With books, magazine articles, and websites, look for the author's credentials and a list of references or source information they used in researching the material. More information on assessing and validating information can be found in the Using The Internet page.

Food Freaking

So, with all the problems associated with animal protein, should you freak out and race to the vet if your iguana grabs a bite of your pepperoni-with-extra-cheese pizza? No.

Should you make it a point to give your iguana a "treat" of some form of animal protein a couple of times a month? No.

We do not know how much animal protein it takes to destroy the liver and kidneys that are already strained by the chronic stresses of captivity. There are plenty of plant-based treats you can buy or grow yourself. There is simply no need to include animal protein in your iguana's diet.

The one exception is the use of very small amounts of yogurt containing live cultures that is given once or twice to iguanas who have been starved or who are on antibiotic treatment. More information on this can be found in the Emaciation (Starvation) Protocol article.

Other dietary concerns

C. Richard Tracy, PhD, now at the University of Nevada, has been studying iguana nutrition for years. He states, "It is very difficult to give a diet that is too low in protein as long as the animals get a balanced 'salad' of food (including alfalfa for protein) and also get plenty of UV radiation." (*Iguana Times* 1(6):15). Exotics vet Jeff Jenkins, in an earlier client care handout, stated "Captive young iguanas do poorly eating a diet of grocery store vegetables. Perhaps because of their rapid rate of growth, it is essential that they be supplemented with protein and a balanced source of calcium." (Jenkins now recommends animal protein-free diets for iguanas.)

While these statements may appear to be mutually exclusive, both are correct. Say "vegetable" and most people will think of a long list of essentially nutritionally empty foods such as lettuces; tomato; cucumber and zucchini; mushroom; alfalfa, vegetable and bean sprouts; celery and celery tops are the more commonly fed non-nutritious foods. These may be great in a salad or on a burger, but they little in the way of nutrients to your diet.

Despite the poor example set by too many pet stores, feeding an herbivorous reptile requires much more than merely dumping a head of iceberg lettuce and some chunks of broccoli into the enclosure. You can't just go out and buy those bags of prepared salad mixes available at most supermarkets. Restaurant and school cafeteria salad bars aren't an option, either, as they are loaded with cheap (nutritionally speaking) filler foods that are great for people who are dieting but provide little in the way of healthy nutrition for your iguana. The key to a proper iguana diet is in selecting the right type of vegetables, greens, and fruit, preparing them properly, and serving them when the iguana should be eating.

Constructing the Green Iguana Diet

At first glance, there appears to be an overwhelming amount of information to read and process to learn about what you should feed your iguana. If you like, you can skip right to the Basic Recipe found in Part 4 just to get the ball rolling, but do come back here soon to read this section. Often times, learning the "why" of something helps not only to remember what you need to do or what your choices are, but helps you remember the information and enables you to evaluate possible alternatives

I SAY COLLARD GREENS, YOU SAY BORECALE, CHOU PRECOCE, COL VERDE NUEVA, LENTE BLAD GROENTE…

As an English-speaking American whose initial audience was primarily other English-speaking Americans, the names of plants discussed in this and other articles at my site are the common names of plants as used in most areas of the United States.

Now that people living in many different countries, and speaking an amazing number of languages, are reading and trying to apply the recommendations in my articles, they have run up against a hurdle: what are all these plants? To help overcome this hurdle, I created a dictionary of plant names containing the names by which plants are known in other languages. While not all plants are found in every country, or in the markets in every country, Vegetable and Fruit Names can help figure out what plants are being discussed and enable readers to either find them in their markets or find seeds or seedlings to grow their own.

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PROTEIN SUPPLEMENT…AND SO MUCH MORE

Since we are not going to be feeding animal protein, and plant proteins have some problems in terms of either not having enough protein or too much of some harmful plant chemical, how are we going to make sure our iguanas get enough protein?

Alfalfa!

Alfalfa is an excellent source of plant protein--just think of what it does for horses! Seriously, though, mature alfalfa is a great source of protein, fiber and calcium. Mature alfalfa is 15% protein by volume and has a 6:1 calcium-phosphorous ratio.

What's the difference between mature alfalfa and alfalfa sprouts? Alfalfa sprouts have considerably less protein, calcium and other nutrients and are not recommended as a primary food for herbivorous lizards. You'll find more about mature alfalfa and its nutritional contribution to the iguana diet, and why sprouts aren't good for iguanas (and pose health risks for humans) in other articles in the Food/Feeding.

Alfalfa Resources

When I first started using alfalfa in the iguana diet, there were few resources easily available. There were the pellet products sold for small mammal pet food and bedding, and small hay bales, also sold for small animal bedding. The pellets were of variable quality, with many containing animal protein, significant amounts of grains or corn, and fat. One could also find larger pellets, those made for sheep and horses, and larger bales of hay, also made for larger farm animals. Thus, the earlier version of this article recommended good quality alfalfa pellets as the source of alfalfa for the iguana diet.

In the several years, alfalfa has become more readily available, in purer forms, as it has become popular as a nutritional supplement for humans. You can now find powdered alfalfa, alfalfa tablets and capsules, and alfalfa leaf tea in health food stores and through mail order vitamin and herb suppliers. You may be able to find some sellers offering the alfalfa powder and tea in bottles, bags and in bulk so that you can buy as little or as much as you need.

Alfalfa pellets and mini-bales are still available, still sold as rabbit food or small mammal bedding at pet stores and farm/ranch supply stores. Generally speaking, however, alfalfa packaged for human consumption is likely to be a little cleaner than alfalfa packaged for animal food or bedding.

Some of the other vegetables in the basic salad recipe and alternatives found below also contain plant protein. Before alfalfa is added, Basic Salad recipe contains about 11% protein based on the data from the USDA Nutrition Database. This works out to less net protein when digested.

Tofu

As a source of protein, some people recommend tofu, a curd made from soybeans. The problem with tofu is that it most forms are high in fat. Since dietary fat impedes calcium metabolism, it can contribute to the development of metabolic bone disease, especially if any other part of the D3-calcium-phosphorus triad is out of balance.

There are some very low fat and a nonfat tofu product available that would be okay for use except for the other problem associated with soybeans and soy product: goitrogens, phytochemicals that interfere with the thyroid gland's uptake of iodine from the diet. When goitrogens are fed in quantity on a regular basis, hypothyroidism develops as the thyroid gland is unable to get enough iodine.

If you eat tofu and want to give your iguana a bit of it when you are making some for yourself, then by all means feel free to do so. It should not be fed on a regular basis, however, and when fed, fed in very small quantities.

Off Topic…Sort Of

The more iguana keepers learn about iguana health and nutrition, the more they find correlations with human and other pet health and nutrition. While there are a lot of differences, there are also a lot of similarities in how certain chemicals, organs and systems, and environmental factors affect many species in the vertebrate animal kingdom.

The goitrogens and fat in soy poses a little publicized health risk for humans, especially women. Not only is hypothyroidism one of the leading undiagnosed and misdiagnosed women's health problems, but peri- and post-menopausal women are being encouraged to consume lots of soy to help alleviate some of their symptoms. Given that these women are already at high risk for osteoporosis--a type of metabolic bone disease--soy consumption is going to heighten the risk of both osteoporosis and hypothyroidism and exacerbate the conditions in those who already have them.)

Regular consumption of tofu has also been found, in one study, to reduce cognitive function in later life.

For more information on benefits and problems, please see To Fu or Not To Fu: Soy's the Question.

VEGETABLES

When people call with problem iguanas, I always ask what they are feeding their iguanas. The answer, invariably, is "Vegetables."

When I ask what *kind* of vegetables, the response ranges from "Well, you know, just...vegetables!" to something along the lines of, "Oh! Lettuce, zucchini, broccoli and once a week or so, a little bit of fruit."

The fact that iguanas can survive for years on a lousy diet makes it all the more difficult for people to grasp that the diet they are feeding their iguana (often coupled with improper environmental conditions) is making their iguana sick and affecting its growth and development.

Your mom or dad probably nagged you to "eat your vegetables!" Since two of my mother's favorite food groups were Coca-Cola®, and See's® Candies, she didn't do much in the way of vegetable nagging. My dad was the veggie and fruit nagger. As it turns out, he was right, although my mom's diet was a lot more fun.

The mainstream and health news over the past decade has been full of reports about research finding that certain vegetables and fruits may help reduce the risks of certain types of cancer and a variety of other diseases and disorders. Consuming of a wide range of vegetables and fruit on a daily or aggregate weekly basis is healthier, reports say, than a diet based primarily on animal protein and grains and tubers.

When we humans follow these dietary guidelines, we will consume a variety of foods during the course of a day, week and month. In this way, the individual vegetables and fruits we eat form only a small part of our total diet, not the primary ingredient (unless you are like me when artichokes and blueberries are in season). So, even if we concentrate on the many vegetables and fruits that are high in antioxidants, individually these plants will still be a part of a much larger diet and so are unlikely to result in the nutrition-related disorders that could result if we ate just a few plants exclusively.

This is essentially how a wild iguana eats. Throughout the course of a year, more than 50 different types of plants will be eaten, providing a wide variety over time, though selections may be somewhat more limited on a season-by-season basis. Iguanas have been documented to travel great distances to get to a particular type of plant, by-passing plants lower in protein (and ignoring small animals and carrion) on their way to those sought-out plants and when returning to their usual basking and sleeping areas.

Falling Into A Rut

Lack of recognizing or understanding the many facets that go into constructing a proper diet for iguanas, combined with trying to keep things as easy or quick as possible for themselves, leads many owners into offering a very limited selection of food on an ongoing basis.

Plants that have the potential for causing harm if eaten as a significant part of diet don't cause problems for the vast majority of humans because we eat these foods as a small part of a much larger, varied diet. Make these problematic plants the main source of food for humans or iguanas and the problems that those foods can cause will manifest.

The convenience and lack of understanding dietary needs and pitfalls is why we see iguanas who are fed on things that people can quickly cut up or pull out of a bag. Broccoli florets and Brussels sprouts are two vegetables that are easily cut into small pieces for iguanas. Bags of pre-washed Spring Greens (which are small leaves of mostly lettuce-type plants) and baby spinach are commonly used or, worse, the bags of iceberg mixed with a few carrot and red cabbage shreds.

When these harmful and mostly low-in-nutrient foods are combined with the equally convenient soaked monkey biscuit, and maybe some kale (all the books list kale as one of the high calcium greens), you get not a healthy iguana, but one that is stunted and lethargic.

These iguanas are also usually deficient in calcium though their owners may not yet have observed the signs. Contributing to the owner's conclusion that their iguana is doing well is the fact that many of these iguanas have great color and got tame very fast.

In fact, their iguanas are malnourished, suffering from hypothyroidism, and on their way to metabolic bone disease.

Goitrogens and Thyroid Function

There are several phytochemicals known to impair iodine uptake or otherwise contribute to the formation of goiter, which is the enlargement of the thyroid gland caused by inadequate iodine uptake. People--and iguanas--may have hypothyroidism without their thyroid gland being so swollen that it is clearly visible as a swelling protruding from their neck.

When fed in excess, broccoli, Brussels sprouts, kale, cabbage, cauliflower, and bok choy, and soy cause hypothyroidism. This disorder causes the metabolic rate to slow down, lethargy, and muscle and joint aches. The slowed metabolism and reduced activity leads to weight gain, but overall growth and development is slowed.

These vegetables may be fed in small amounts in addition to the regular vegetables, mixed into their salad, but should never become the primary ingredients or regular additions to the diet.

Brief Introduction to Calcium Metabolism

During the course of normal digestion and metabolism, the calcium from the food the iguana eats is mixed with calcium mobilized (pulled by the body) from the bones. This mixture of dietary and bone-derived calcium is circulated throughout the body in the bloodstream. The calcium is used by many of the body's systems and cellular processes. The amount of calcium that was originally "borrowed" from the bones is returned to the bone to solidify the bone matrix.

When a diet high in calcium oxalates is fed, this last step fails to take place. Instead of all of the borrowed calcium being returned to the bones, it keeps circulating until it deposits itself into the soft tissues, eventually causing pain and organ dysfunction. The bones, continually stripped of calcium over time, become brittle and porous. They become so fragile that they are at high risk of breaking under the least pressure. Loss of bone density due to high a high oxalate intake is just one type of metabolic bone disease, MBD being an umbrella term that covers the different types of health problems caused by the different ways calcium in the body is affected by diet, age and other factors.

Effects of MBD

In most forms of metabolic bone disease, the bones begin to look like sponges as the calcium is pulled out of the bone matrix. Swellings along the long bones and tail begin to appear as fibrous growths are formed around the bone to try to hold the weakened remnant of the bone together. The bones at this time are easily fractured.

In advanced cases, the jaws become too soft and swollen for the animal to self-feed. Partial paralysis and tremors may set in, and the iguana becomes too weak to climb or even support its body on its legs.

Early on, when the telltale bumps are first felt along both the thighbones, there is time to reverse the condition by correcting the diet and ensuring proper access to ultraviolet B.

If the diet and/or environment remain unchanged, however, or not corrected to the degree required, the disease will progress to the point were veterinary intervention will also be required. Radiographs may be needed to assess the degree of bone loss and locate any fractures that need setting and immobilization. A vitamin D3 injection may be required, as well as injections of calcium and prescription calcium supplements. A course of antibiotic therapy may be necessary, as may rehydration by injecting the appropriate fluids.

All in all, it is much easier and cheaper (in the long run!) to feed the proper foods to begin with. For a more in-depth discussion of this process and resulting medical problems, please see my article on Calcium Metabolism and Metabolic Bone Disease.

High Oxalate Plants

Oxalates and oxalic acid cause two main problems in iguanas. They bind with calcium, leading to metabolic bone disease.

They can also create tiny crystals that are deposited in soft tissues and in joint areas. If the soft tissues they settle in any of the organs that keep the body running, the organ function is impaired and eventually cannot perform adequately to do its job: it fails. If the crystals settle in muscle tissue or around joints, they cause pain and stiffness, both of which impair mobility.

Spinach, rhubarb, beets, parsley and chard are high in oxalate and/or oxalic acid. We cannot avoid oxalates completely, as most leafy greens, and some vegetables and fruits, have at least some oxalate and/or oxalic acid. What we can do is make decisions to maximize the nutritional punch of the overall diet while minimizing as much as possible the amount of these potentially harmful plant chemicals.

Oxalates and Goitrogens: Getting Them Mixed Up

In the late 1990s, reflecting, perhaps, the increased use of the Internet for research and information, it became apparent that a lot of iguana keepers were confusing goitrogens and oxalates, specifically, which plants have what chemicals, and what the impact of those chemicals were if fed regularly.

Some plants containing goitrogens also contain oxalates. Some plants high in oxalates also contain some goitrogens. Take, for example, kale. Kale not only binds calcium because of the oxalate it contains, but it also contains goitrogens, the chemicals that bind with iodine and prevents its uptake by the thyroid gland. If kale is fed regularly as a primary component of an iguana diet, it can cause health problems down the road. If the rest of the diet is also high in goitrogens, then hypothyroidism may develop. If the diet is high in oxalate, oxalic acid, low in calcium or deficient in UVB access, MBD is probable, and a given in gravid iguanas.

By being clear about which foods pose risks for MBD and which for hypothyroidism, we can use this knowledge to make the compromises and compensations to the diet to ensure that, overall, the diet we feed is more beneficial than harmful over time. Trading off higher oxalate foods on different days, and supplementing calcium will help ensure the iguana has the calcium he needs and reducing the likelihood of soft tissue mineralization. Goitrogenic plants can certainly be fed, but not every day and not in quantity.

Reptile veterinarian/nutrition researcher Susan Donoghue wrote, in *Fact vs. Fiction: Clarifying and Verifying the Literature and Conversations on the Internet* (1995 Proceedings,

ARAV, pp. 55-58): "Indeed, all plants contain substances termed 'secondary plant compounds' which pose some risk when consumed. These non-nutritive substances include saponins, phenols, and alkaloids and serve as deterrents to bacteria, fungi, and herbivores. Spinach, as with kale, is a nutritious and tasty green that can be included as part of a mixed salad for herbivores. Just as I discourage feeding a diet of only kale, so I suggest avoiding diets of only spinach. However, spinach is safe to include as part of a *balanced diet*." [emphasis mine]

Variety is key. If your supermarket isn't stocking the greens you are looking for, ask them to do so. Check out other markets in your town, both chains and ethnic markets, as they may already carry what you are looking for. Find out when and where the weekly or monthly farmer's markets are, and use them as your greenery when they are available.

Another possibility: grow your own. If you don't have land area in which to put a garden, consider container gardening. You can plant several containers with edible greens, even flowers. You may not be able to grow enough to completely sustain your iguana, but you'd be surprised how much it can help. You say that you don't have sprinklers and you don't have time to stand there with a hose or the funds to put an in-ground system in? No problem: Rain Bird and similar component systems, found at most hardware stores, garden centers and home builder supply stores, make it easy to lay down surface tubing, customize drip systems for containers. You can even set up sprinklers. All you need to do is walk outside, turn on the timer, and let it do its thing. If I can do it, anyone can do it!

Plant Offense and Defense

Chemicals such as oxalate, oxalic acid, saponins, goitrogens and others that can be harmful to a wide variety of animal life are not just *there*. They are there for the same reason that animals have claws, teeth, shells, stingers, and beaks. These types of phytochemicals are, in a sense, the teeth and claws of plants. They, along with thorns and prickly "hairs" comprise the plants' defense against undesirable predators.

Conversely, colors, flowers and fruits often co-evolved with certain types of birds and other consumers to increase cross-pollination success and the spreading of seeds, the ways in which many plants reproduce.. While some of these chemicals may be bad for our iguanas (or for humans), they aren't bad in and of themselves. Rather, they are part of the plant's defense against undesirable predators while making issuing invitations and making accommodations for desirable consumers.

Another Calcium Caution

In aggregate, the iguana diet needs to have a calcium-to-phosphorous ratio of 2.1:1. That is in aggregate, not each food, or each day, but overall, during the course of a week or month. Since plants are generally higher in phosphorous than they are in calcium, some of our plant choices are geared towards including the plants with the higher calcium, or closer to 2:1 ratio, in the iguana diet.

Some people, however, go overboard and chose only those plants that have a 2:1 or better ratio. What they don't realize is that the iguana diet must be more than simply the calcium:phosphorous ratio because iguanas need more than calcium to survive. They need the full range of vitamins, minerals, trace elements, protein, carbohydrates, fat (very little), and fiber (a lot). They need carotenes, and antioxidants and everything else that goes into making a healthy diet. If a diet is made up of only those plants that have a 2:1 ratio, it will be deficient in protein, fiber, and most other essentials. In other words, by concentrating on just this one facet of the diet, their iguanas will end up being malnourished.

For more information on vitamin and mineral supplementation, please see the Vitamin Supplementation information in the Basic Recipe section of this.

Frozen Vegetables, Greens and Thiamine (B_1) Loss

While thawed frozen vegetables and greens are undoubtedly the easiest to use, the thiamin in some green vegetables and leafy greens is destroyed when they are defrosted (Frye, 1991). During the defrosting, thiaminase, the enzyme that destroys thiamine, goes about its job of destroying thiamine. Unfortunately, there is no hard information on just which green vegetables lose thiamine, how much thiamine is lost, nor how much thiamine iguanas need on a daily/weekly/monthly basis. If you are feeding your iguana mostly defrosted green vegetables and leafy greens for more than a week, supplement their diet with extra thiamine.

Thiamine, also known as vitamin B1, is important for the nervous system and helps convert carbohydrates to fat and amino acids to protein. In conjunction with the other B vitamins, thiamine helps reduce the effects of stress, promotes proper growth, and aids digestion. Thiamine interacts with other vitamins and minerals as they do their jobs within the body.

Thiamine is a water-soluble vitamin. Excess amounts are flushed out of the body and so the vitamin must be a regular component in the overall diet, with enough thiamine taken in to sure the body is getting all it needs. When thiamine is lacking in the diet, the other B vitamins are unable to perform their functions properly and a variety of health problems will result.

The most common signs of thiamine deficiency are tremors and partial paralysis. Veterinarians who are not aware of the frozen greens/thiaminase connection often confuse these signs with a calcium deficiency. They begin to treat the iguana for a calcium deficiency, becoming more aggressive in treatment as the iguana fails to respond "properly." This becomes a harrowing experience for the owner, an irritating one for the vet, and an increasingly painful and debilitating one for the iguana.

By all means, keep a bag of suitable grocery store mixed vegetables on hand to use in case of extreme emergencies for a couple of meals (be sure to replace with fresh packages at regular intervals to guard against moisture loss). Better yet, consider making extra batches of the Basic Salad and freeze a couple of weeks worth a couple of times a month, using the frozen food during the month in which it was made.

If you are relying heavily on defrosted green vegetables and greens to feed your iguana, you can ensure that your iguana is getting adequate thiamine by adding some powder from a crushed thiamine (B1) supplement. You will find this product sold wherever human vitamins are sold. Use a tiny pinch per serving of salad, and half a tablet or so in a recipe batch of defrosted salad.

No More Brewer's Yeast

When I first developed the salad and became aware of the thiaminase problem, the only widely and easily accessible form of B1 was brewer's yeast, a yeast product used in beer making (not the yeast used in bread making). Brewer's yeast was sold in pet stores and human health food stores as a nutritional supplement.

Brewer's yeast is also very high in phosphorous, something iguanas and other herbivorous reptiles do not need more of. Now that B1 is widely available through online vitamin sellers and every store that sells vitamins and minerals, there is no reason to use brewer's yeast or to recommend it as an alternative to a stand-alone thiamine supplement.

FRUITS

We have always been taught that fruits are healthy for us, and they are, up to a point. When fruit becomes the major part of any diet, that diet is not balanced as fruits cannot provide much what humans--or iguanas--need.

While they are a good source of moisture, most fruits do not contribute much in the way of the things iguanas need. The majority of them are low in calcium and protein and high in phosphorus. Melons are bright and juicy but, aside from being a good way to get fluids into a dehydrated iguana, are pretty much just water and sugars.

There are some healthier fruits your iguana can be fed on a regular basis as a part of his diet: mango, papaya, pear, blueberries, cherries, and strawberries. They can be fresh or frozen,

so seasonal availability isn't a problem. Peel the mango and papaya, and remove the seeds from both before feeding.

The best fruit--and the one highest in calcium--is figs, generally an iguana favorite. Fresh figs can be found during the summer months in grocery stores. They tend to be quite expensive, so consider planting a fig tree or two in your yard or a large container. When feeding figs to hatchlings, scoop out the seeds as too many of them may get caught in a hatchling's gut, especially in iguanas recovering from malnutrition, starvation, or metabolic bone disease. When you can't find fresh figs (or your tree isn't too young to produce enough), consider buying dried figs, then reconstituting them in hot water, or by soaking overnight in tap water.

The iguana nutrition research and resulting recommendations for the amount of fruit in the iguana diet is quite consistent: fruit should compose the smallest part of the diet in iguanas, no more than 10% of the total diet (mixed salad and greens) over time. While fruit doesn't add a lot in terms of nutrition, it does help provide color (attractiveness) and moisture to the diet. Juicy fruits also make a nice mid-day treat, so use as treats those fruits that your iguana likes, such as bananas, that are otherwise not good for the daily diet.

LEAFY GREENS

Several types of leafy greens are nutritious, but most leafy greens lack the protein punch of the other types of vegetables. Leafy greens are also where you will find the majority of the calcium oxalates in plant foods suitable for iguanas. That is why I recommend using a combination of a vegetable/fruit/alfalfa salad in combination with leafy greens. See Part 4 for more information on the types of leafy greens that are best to feed and those that can be fed occasionally, and those that should be avoided all together.

Herbs

Many iguanas enjoy the taste of some herbs, such as basil, cilantro or oregano, so feel free to chop or mince your iguana's favorite and add them to the Basic Salad or toss with their leafy greens.

Some herbs contain harmful plant chemicals that could cause problems when fed regularly in quantity, so use herbs as you would in your own cooking, in very small amounts added just for taste. They should not be used in place of any of the greens discussed above.

Sprouts

As mentioned above, bean and vegetable sprouts do not have much in the way of nutrition. In addition, they are bulky and, if used in a salad as a vegetable or green, may form too big a part of the volume of that meal. This means that your iguana will actually be getting less in the way of nutrition than the same salad without the sprouts. If you have some sprouts around for yourself and your iguana likes them, then go ahead and give him some as a sort of "junk food" treat.

EDIBLE FLOWERS AND POTTED PLANTS

There are several edible flowers that you can grow yourself or buy in the produce section of some supermarkets or gourmet/specialty food markets. Since nutrition analysis of plants and other foods is very expensive, the majority of funding goes towards foods that are consumed by humans and farm animals. As a result, there is little or no data on ornamental plants. For this reason, plan on using the leaves and flowers of safely edible ornamental plants as treat foods only, not in place of one of the appropriate leafy greens or vegetables discussed in Part 4.

If you grow your own squashes, or have a yucca tree in your yard, you can feed their flowers--not the leaves--to your herbivores.

If your yard sprouts dandelions, think twice about pulling them or using an herbicide on them. Not only are the leaves very nutritious, but so are the tasty flower heads. Pick the flowers before they become seed heads and you will be able to prevent the plants from taking over your yard.

If you are growing peas or green beans for your iguana, you can also feed him the leaves of these plants. If you don't grow your own, you may be able to find some in ethnic markets. These plants are not the same as the ornamental sweetpea plant that is grown for its colorful flowers, not for its pods. These plants--leaves, flowers and pods--are all considered toxic.

Other edible plants include hibiscus (flowers and leaves) nasturtium (flowers and leaves), rose petals, violets (flowers and leaves), pansy flowers, and geranium petals. African violets, considered to be toxic, are not the same as violets (*Viola* sp.).

Indoor plants include pothos and spider plant. Because of their destructive tendencies, it is not a good idea to furnish an iguana enclosure with potted plants as they will be shredded, squashed or consumed within a very short time!

Even if the plant species is considered safely edible, plants grown for florists or garden centers may have been treated with systemic or topical pesticides. Ask the nursery or plant manager if they know whether their plants have been treated. If they don't know, err on the side of caution and don't buy them to feed to your iguana.

You will find extensive lists and other resources on harmful and toxic plants and plants safe to eat, in the Plants section of this site.

Potentially Deadly Fallacies and Mythunderstandings

Many pet owners, especially keepers of exotic or wild animals, believe that their animals know instinctively what is good for them and what will harm them. After all, no one takes pains to make them eat a healthy, nutritionally balanced meal in the wild! Unfortunately, iguana keepers who let their iguanas dictate what they will eat end up with malnourished iguanas. Worse, some end up with dead iguanas because their iguana munched on a toxic house or other ornamental plant.

Iguanas Know Instinctively What Is Good (Healthy And Safe) To Eat

Iguanas in the wild do know what is safe to eat and what isn't. Through generations upon generations upon generations of green iguanas, those who made good choices about what plants to eat, and which plant parts, when, and how much to eat, survived and so passed along the genes that made them successful at surviving in their environment.

Iguanas in some areas weren't so lucky, like the Panamanian iguanas whose hilly jungle suddenly became a canal and giant lake connecting the Pacific and Atlantic oceans. Or the Venezuelan iguanas living on small islands in what was once a hilly, forested region until it was flooded to create a dam. With traditional food resources destroyed and increased competition for what remained, those iguanas who were successful in selecting new plants--or other food resources--to try survived. Those who chose the wrong plants, or plant parts, or the season, in which they ate the plant, died.

Those who chose to try animal protein survived long enough to reproduce several clutches, so the there was no adverse effects on reproduction, other than that the overall number of years animal protein-eating iguana were alive to breed were greatly reduced.

The iguanas simply could not bring themselves to try anything other than what they were used to eating, died. They slowly starved to death as those food sources were wiped out or the lizards become too weak to compete successfully against stronger iguanas and other herbivorous animals competing for the same plants. The iguanas that were successful (chose more safe plants or plant parts rather than toxic ones) survived and produced more offspring. The others didn't.

Captivity Isn't The Wild

Captivity bears absolutely no relation to the wild environment or, one hopes, to the filthy disease-ridden "farms" that are the source of most pet trade iguanas. In captivity, as in the wild, our iguanas will express one of the traits described above in the discussion of iguanas in altered habitats.

First is the "okay, I'll try anything" iguana. Initially, he's a joy because once he starts eating, he'll eat anything you put in front of him. Then he becomes a problem for the same reason: he'll eat anything. He'll eat your breakfast, your lunch, your dinner, your junk food snack, your houseplants, and the two dozen chemically treated long-stemmed roses you got for your anniversary. He'll also go after that prized azalea bonsai you've been cultivating for the past 30 years. He's the most likely to eat plants and objects he finds laying around on the floor, your desk, coffee table, in the kids' room. So the good news is he'll eat anything unless what he eats causes a complete intestinal blockage or outright kills him.

The second type is a little more of a problem because he has no clue what he is supposed to do with the stuff you are putting in his enclosure. He might recognize some of the leafy greens (usually the types you shouldn't be feeding him to begin with) but he doesn't understand that the shredded veggies/alfalfa/fruit salad is food. He finally starts eating the one thing he recognizes, probably from the pet store: lettuce. If you're lucky, it's romaine lettuce. That's all he'll eat, so you keep caving in and feeding it to him.

The third one simply won't eat anything. No matter how you prepare it, what color it is, whether it is healthy for him or not: he won't eat it.

If you believe iguanas know what's good for them, you're going to have a real problem keeping any of these iguanas alive. The first type has the best chance, so long as you don't have any toxic plants accessible to him and are obsessive about your housekeeping. The second type will live longer than the third type, but will still die slowly of malnutrition.

Clearly, we don't want our lizards to starve, but neither can we let them eat marginally nutritious foods and develop the host of disorders linked with chronic malnutrition. There are a couple of ways to deal with these picky eaters, described in my Picky Eaters article.

The bottom line is that, while the iguanas may have a field guide to edible plants hardwired in their brain, the field guide covers only the plants native to the areas they come from. In captivity, they are dependent upon us to make the right food choices for them. And, just as we do when we have infants and toddlers in the home, we have to iguana-proof our home, making sure that toxic and harmful houseplants are secured away from them or removed altogether.

Indiscriminate Consumption

As mentioned above, some iguanas will ingest just about anything. The variety of objects that have been removed from iguana intestines is astounding, making it clear that some iguanas will pretty much swallow anything that isn't nailed down. Items reported by vets and iguana owners include: balloons, condoms, push pins and thumb tacks, clumps of human hair, rubber bands, scouting pins, sand, bark, rocks and pebbles, small toys, and, in one notable instance, a pair of Victoria's Secret silk panties.

Commercial Foods

With the explosion of reptiles as pets, so too has there been an explosion of products for those pets. Unfortunately, as with pet products in general, there are a number of products that are useless or, worse, downright harmful. Most of the commercial food products fall into these categories. The main facts to keep in mind about commercial reptile pet foods are:

- They are designed to feed the American demand for convenience pet foods ("if it's good enough for dogs and cats, why not exotics?"). Of course, many commercial dog and cat foods aren't good for the dogs and cats, but at least there is 30+ years of research backing up the good cat and dog ones.

- They are designed to separate the pet owner from their money. (As a Four Paws distributor once snidely informed me, "Pet owners will buy anything that has a picture of their pet on it, whether it is any good for them or not." Four Paws, by the way, makes, among other things, the highly questionable "VitaSpray" spray-on-the-body vitamin product for reptiles...)

- There is a very interesting paper on commercial reptile foods by reptile vets/nutrition researchers Susan Donoghue and David Dzanis, titled *Evaluating Commercial Diets*. This paper is a must-read for anyone considering using a commercial reptile food product for any of their reptiles. I take a tongue-in-cheek look at the commercial reptile pet food industry in *Commercial Reptile Food Development*.

Are there any commercial foods that would be safe and appropriate for green iguanas? My personal criterion is to look at the list of ingredients and note the type and order of ingredients. Preferred are ones that have alfalfa as the first listed ingredient. They should not have any or very little corn, wheat, or soy, or more than 10% fat. Marginally nutritious vegetables, fruits, or flowers do not impress me. Animal protein, needless to say, will eliminate a food no matter how good the rest of the ingredients are. Artificial colors and flavors, leading to a product that looks like "Trix® for Igs", or 'junk food' (such as the Ocean Nutrition product whose "secret" ingredient was grape jelly). I also look at the reptile products the company makes. Too many products that show lack of research or careless disregard will bump the food product into the "forget it" category.

The only commercial food product I would consider using is an alfalfa-based product in place of the alfalfa I already use, or to rotate the plain alfalfa with the alfalfa-based product just for the sake of variety.

Never would I consider using any commercial food by itself, nor would I feed it dry, as is recommended on the product labels. I am frankly not impressed and more than a little concerned about any product whose instructions specify to feed it dry and/or to not offer other vegetables and fruits.

The One Exception: Quantum Nutrition

There is one not-quite-commercial line of food products I do feel comfortable recommending. In the course of her research on green iguanas and other reptiles, Dr. Donoghue developed her own diets that she has fed over the years to her reptiles and. She now offers the formulations for sale to the general public. If you want a nutritionally sound food product to use all the time, or to supplement your iguana's diet when fresh produce is scarce, or to keep on hand for emergencies, you may want to look at Donoghue's Quantum Nutrition formulations. Her iguana products are formulated to be fed with romaine, the most widely available green, and do not require any vitamin or calcium supplementation. Her herpnutrition.com site has information on the research, formulations, and feeding instructions.

Some final remarks

Since we do not have access to the majority of the plants iguanas eat in the wild they are dependent upon us to make the right decisions about their diet. We have to ensure that they get a good basic foundation of nutritious foods. A properly constructed diet, such as the my Basic Salad discussed below, that has been fed over a long period of time and so far demonstrated no adverse impact while promoting growth and development comparable to wild iguana populations, is what you want to feed your iguana.

Upon this foundation, other vegetables and fruits can be added as whim or the contents of your refrigerator permits. Providing such a foundation can be time-consuming when the foods are prepared on a daily basis, or even when prepared a couple of days in advance. This is, I believe, why people settle on "fast foods" such as the bagged baby lettuces and the easily-rendered-into-small-bits broccoli and Brussels sprouts mentioned above.

Fortunately, between kitchen devices that make it much easier to prepare large quantities of fresh vegetables, and being able to freeze batches of the salad, iguana owners on a tight work or school schedule can still prepare and feed their iguana a proper diet.

For those of you who are not well acquainted with the produce department of major supermarkets or green grocers, or who live in countries where these plants may be known by very different names, there are many websites offering pictures and descriptions. The employees who work in the produce departments at markets are generally proud of their departments and are happy to identify strange looking things for you or point out things you might be looking for. They may also be willing to start carrying produce you want, especially if there are several iguana keepers in the area who are interested in getting the same things. For a quick reference, check out my MK Salad: An Illustrated Reference and the other resources on my Plants and Food/Feeding pages.

Finally, while the top vets do recommend supplementing the diet--even good ones--with a good multivitamin and calcium supplement, no amount of vitamins or minerals are going to compensate for a lousy diet. What goes for computers goes for iguanas: GIGO - garbage in, garbage out. While you can hit ESC or reformat your hard drive, you can't reformat an iguana who died of a nutrition-related disorder. If your iguana is still alive, however, it's never to late to start doing things right.

PART 4: FOOD PREPARATION AND FEEDING

If you think shopping for all these vegetables and greens and trying to figure out where to stash them in your refrigerator is stressful, your fun has just begun. Now you have to learn how to make the salads and serve them!

Food Preparation

Iguanas, though equipped with a set of very sharp teeth, do not chew their food. Instead, they gulp it rather like a dog gobbling its food. Nonetheless, I regularly see iguana owners and pet stores put out a lovely selection of foods--whole broccoli florets, whole grapes, lengths of quartered or discs of sliced carrots, cubes of raw acorn squash, dry monkey biscuit. In one memorable store, there was a whole apple. Rather than realizing that their food preparation is wrong, the owners and store employees just figure that the iguana must not be hungry, or that iguanas don't eat very much.

When it comes to preparing anything other than the leafy greens, most new iguana keepers start with the low tech food processors: a pair of strong arms and a grater. Once their iguanas are eating more than a tablespoon full of Basic Salad a day, most iguana owners quickly realize that a full-sized or mini food processor, Salad Shooter®, mandolin or similar hand-held or counter-top food slicer/shredder is a necessity, not a luxury. With these devices, you can quickly make enough Basic Salad to last a week or two. The salad, stored in an airtight container in the refrigerator, is ready to whip out and spoon into the iguana's food dish, then place the remainder back into the refrigerator.

Plan ahead with the leafy greens, too. Wash, blot dry, and tear them into pieces, then place in a ziplock bag with all the air squeezed out, or put into one of the new zip bags made for vegetables). Prepared and properly stored fresh greens can last 5-7 days.

Feeding your iguana a healthy meal before you leave for work or school can thus be done quickly and easily.

A NOTE ON THE HISTORY OF THE "BASIC SALAD"

The iguana salad recipe that follows has become known around the Internet as the *MK iguana salad, MK's salad*, or the *MK diet*. It has been published in various forms through the years, in articles and caresheets, and posted around the Internet. As people talked about it, or were giving advice to new iguana owners, they started referring to it by some variation of "the MK salad" name just for the sake of calling it something short and easy.

The mix of vegetables, alfalfa and fruit is just one component of the overall diet I recommend. The salad, plus the leafy greens, plus appropriate vitamin and mineral supplements, form the iguana's captive diet. The supplemented salad, while healthy enough to feed on its own for a period of time when leafy greens are not available, is intended to be a part of the total diet.

For years I did not include a specific recipe, figuring that iguana keepers were more than able to concoct their own from the information I provided on vegetables and greens that were identified as being safe for frequent use and those suitable only for occasional use. As more people gained web access and clamored for a specific recipe, I developed the "Basic Salad" recipe for those who, due to busy work and family schedules (or because they simply didn't know their way around a produce department!) wanted a no-brainer approach to salad-making.

The ingredient list in the Basic Salad recipe is not meant to a finite list. It is not intended to be the *only* foods you can or should feed your iguana. However, iguanas fed this salad for months and years on end will do just fine on it. If you have the time and inclination and access to produce to vary it within the other guidelines, vary it! If you don't, don't! It is meant to be as flexible as you need it to be while still providing the overall guidelines to ensure your iguana and other herbivores are fed a balanced diet that falls within the nutritional recommendations for protein, fiber, fat, carbohydrate, and supply the calcium:phosphorous ratio for the species as we know them to be at this time.

The overall diet is not high in phosphorous as some people have stated; in fact, it comes out to a 2.1:1 Ca:P ratio. Any vegan and/or grain based diet runs the risk of being high in phosphorous and low in calcium. Any diet high in leafy greens and certain vegetables is going to have a lousy calcium oxalate:calcium ratio. That is why I have chosen to incorporate trade-offs in the overall diet. For example, instead of using high oxalate carrots all the time, I use orange (Winter) squashes, which are not high in oxalates, enabling me to not worry too much about feeding collards, mustard and dandelion greens, all of which also contain oxalates. Kale and chard are high in oxalates and high in goitrogenic compounds. So I opt to feed them and other goitrogenic vegetables only occasionally. I opt not to feed spinach (and took parsley out of the diet years ago) because it is very high in calcium oxalates, and there are plenty of other leafy greens I can choose from and still provide a variety of tastes and textures over time.

That being said, when I am making myself a spinach salad, I'll toss some spinach leaves in the iguanas' pile of greens. My iguanas and tortoises eat everything I give them, have never showed signs of being bored, and are healthy, hardy and thriving. So, too, are the iguanas kept by the thousands of iguana keepers I've met through the past decade who have obtained this diet information from the Internet, herp society newsletters, online forum, magazines, friends or their vets.

Because any diet we can provide our iguanas is, at best, only an approximation of the nutrients of the highly varied diet they eat in the wild, I have long felt that it is appropriate to supplement their diet with multivitamin and calcium supplements. My concerns along this area were borne out by research done by reptile veterinarian and nutrition researcher Susan Donoghue who also found that regular supplements are important. This has nothing to do with any particular inadequacies in the diet, but everything to do with the fact that, no matter how good our captive diet is, it simply is not and never will be the same as the seasonally varied wild diet.

In fact, an article just published in the *Journal of the American Medical Association* stated that human vegans are at higher risk of inadequate vitamin intake or absorption of vitamins [*JAMA. 2002;287:3116-3126*][8]. Iguanas are vegans, eating no animal protein nor anything derived from animals, such as honey, eggs, cheese, etc.

> Add to the above the fact that soil nutrient depletion, growing practices, and harvesting, transport and storage practices can reduce the nutrients in produce, supplementing a good diet with a good multivitamin and minerals helps ensure that we and our iguanas will get the nutrients they need.

Wild iguana diets may be high in phosphorous and calcium oxalates. We simply do not know, nor will we ever know unless someone is able to fund and conduct an in-depth analysis of the hundreds of plants and plant parts consumed by wild iguanas.

There are other factors that affect the iguanas' ability to metabolize and handle harmful phytocompounds in captivity. The chronic low levels of stress in captivity, coupled with chronic mild dehydration, may well affect their ability to absorb or utilize nutrients and deal with secondary plant compounds. Adding additional vitamins and minerals in the form of supplements can, as it does in humans with absorption disorders, help make sure that the iguanas get what they need.

The best argument for or against this diet, of course, is in the blood tests and x-rays of iguanas maintained on this diet as well as their growth and development. When constructed properly, according to the guidelines above and below, and maintained in a proper physical environment, these iguanas do not get metabolic bone disease and their growth rate, sexual maturity and overall size are comparable to those of wild iguanas.

BASIC SALAD

The Basic Salad is the vegetable, alfalfa and fruit mixture. It is made from fresh, raw vegetables including at least one green and one orange vegetable, parsnip, and alfalfa (for protein and color), and a fruit (for moisture and color. The Basic Salad provides a significant amount of the protein, calcium and fiber iguanas require.

Remember

The Basic Salad is just part of the total diet. It is served along with the leafy greens. If at first your iguana ignores the Basic Salad and eats only the greens, try withholding the greens until he starts eating the Basic Salad. Once he is eating the salad without hesitation, then you can reintroduce the greens.

Green Vegetable

For the green vegetable, use whole fresh green beans, snap peas or snow peas, that is, the peas and their edible pods. Wash the pods well, tearing off any stems. Chop them by steel-knifing them in the processor or chop by hand. Remember to process or hand-chop until the pieces are small enough to be easily swallowed by a lizard who gulps his food rather than chews it.

To vary the flavor and smell, you can occasionally throw in a small amount of broccoli, bok choy, Brussels sprouts.

Orange Vegetable

For the orange vegetable, concentrate on the winter squashes. These are the hard squashes that, when cut open, reveal their deep-to-pale orange flesh. Winter squashes include acorn, banana, delicata, Hubbard, kabocha, pumpkin, spaghetti and turban.

These squashes are called "winter" squashes because, when kept in dark, cool, dry places, they will stay fresh for several months. Those harvested during the mid- to late summer will stay fresh throughout the winter months when stored this way. This makes it easy for most of us to stock up on fresh pumpkins or other squashes when they are on sale, making fresh squash available throughout the winter to our iguanas.

To make cutting into the harder squashes a little easier, microwave them until they are just soft enough for you to cut into pieces. Peel the squash, and then cut into lengths that will fit through the food processor's or other shredder's feed tube. If grating y hand, cut into sections that are comfortable for you to hold safely.

Some iguana owners have reported that kabocha squash brings out blue accent skin colors on some iguanas, more so than other winter squashes. All squashes are high in carotenoids which, in other species, are known to bring out some latent coloring.

Crookneck and scallop squashes, both soft summer squashes, are fine to use in season. They have the soft skins and flesh that are eaten, raw or cooked, without removing their seeds. The two squashes that are not suitable for use as anything other than an occasional treat are cucumbers and zucchini. Both are poor, nutritionally speaking.

Carrots and sweet potatoes can also be fed, but they do contain oxalates, so use them occasionally, sticking to winter squashes as your primary orange vegetable. Yams are okay occasionally, as well; however, they contain oxalates as well as saponins, so should be used even less frequently than the carrots or squash. All of these vegetables should be shredded.

If you are also using a parsnip, which is a seasonal vegetable in some regions of the country, the parsnip can be shredded at the same time as the orange vegetable.

Other Vegetables

Your iguana may enjoy some of the following vegetables that may be used in small amounts. These should be considered as flavorful additions to the Basic Salad, not a replacement for the more nutritious vegetables. Try mushrooms, bell peppers, onions, green onions, other root vegetables, cactus pad, star fruit, asparagus, okra, and just about anything you see in the produce department that looks interesting. Some of these vegetables have oxalate, oxalic acid, and other chemicals that you don't want too highly represented in your herbivore's diet, so do go easy on them.

Fruit

Fruit is used more for color and moisture than it is for its nutritional contribution to the overall salad. Just as some vegetables are more nutritious than others, so too are some fruits better than others in this regard.

Many types of fruit are suitable for the salad: raspberries, blueberries, mulberries, strawberries, pears, plums, mangos, papayas, cherries, apricots, cantaloupe, prickly pear cactus (nopales) and kiwi (both skinned) are all good fruits. As you may have noticed, most of these represent the most expensive fruits found in the market, or are only available seasonally. Fortunately, most markets have frozen blueberries, strawberries and cherries all year, and you can sometimes find frozen mango and berries at specialty stores such as Trader Joe's.

Figs are the highest in calcium, with dried figs highest of all. Unfortunately, fresh figs are rather expensive unless you are lucky enough to have a tree. Dried figs are available in grocery stores during the November-December holidays, but can often be found throughout the year at health food stores. Dried figs must be soaked in water to rehydrate them before feeding them out to your iguanas.

Fruits should be steel-knifed or finely chopped, then mixed in with the vegetables. Fruits suitable for occasional treats include banana (high in phosphorous), carambola (star fruit; high in oxalates), melons, berries, and grapes. Hard fruits should be shredded. Berries, melons, and grapes should be chopped into smaller pieces. If the grapes have large seeds (such as Globes), remove them before serving to small iguanas.

Do not feed the melon skin, banana skin (unless you buy organically grown bananas - all others are treated with a fungicide to retard mold growth on skin). Do not feed papaya, pear, apple, plum, peach, nectarine, or other seeds. The tiny seeds in berries, seedless grapes, and bananas are fine.

Some iguana keepers have reported that their hatchlings became impacted after several weeks of eating fruits with lots of tiny seeds, such as figs and raspberries. Along with making sure that all dried fruits are thoroughly reconstituted, alternate these seeded fruits with ones from which you can easily remove the seeds.

Adding the Alfalfa

The goal is to have the alfalfa dispersed evenly throughout the Basic Salad. Depending on the form of alfalfa you are using, you may need to do a little work to it to get the alfalfa ready to mix in.

Alfalfa tablets will have to be ground into a powder (a pill crusher, or coffee or nut grinder work well). If the alfalfa came in pull-apart capsules, pull them apart and empty out the powder, discarding the empty capsules. If you bought alfalfa leaf tea in tea bags, just tear open the bags and empty the contents into a storage container and add to the salad as needed. To add the

these forms of alfalfa to the Basic Salad, just mix the alfalfa in with the prepared vegetables and fruit.

If you are using the alfalfa pet food/bedding pellets, the pellets should break down in the juices of the vegetables and fruit. If the pellets do not break down within a few minutes, you can add some water to the salad, or soak the pellets briefly before mixing into the salad. If the pellets still don't soften enough to fall apart on their own, stop using that product and switch to another brand or, better yet, a powder or leaf product made for humans.

Multivitamin and Calcium Supplementation

The questions and issues relating to multivitamin and calcium supplementation is addressed above and in greater length in the Vitamin Supplementation article. For convenience, I have excerpted the age/health status/frequency table here, but it is recommended that you do read the full article at some time.

The amount of calcium and vitamin supplement will vary depending upon the quantity of food you are serving as well as the iguana's health and age. The rule of thumb, however unscientific it is, is to mix into the Basic Salad a pinch or two of the vitamin powder. If you need to at this time, add the thiamine supplement and mix that into the Basic Salad as well. Place the salad in an airtight food storage container and keep refrigerated.

IGUANA AGE & HEALTH STATUS	MULTIVITAMIN/WEEK	CALCIUM/WEEK
Less than 1 year old	4-5 x	7 x
1-2 years old	3-4 x	5-6 x
Over 2 years old	2-3 x	4-5 x
pre-breeding and gravid	2-3 x	5-6 x
Sick or emaciated, > 1 year old	3-4 x	5-6 x

Most books say to sprinkle the vitamins on top of the food. This probably stems from the time when iguanas were neither heated nor fed properly so they rarely finished their food. Sprinkling the vitamins on top meant they were going to ingest more of the vitamins but, as we know, a lousy diet or environment is not going to be fixed by gobbling vitamins. So, thoroughly mix those vitamins into the salad before you set it out for your iguana.

A special reminder to those who opt to use Dr. Donoghue's Quantum Nutrition food mixes. If you use the Quantum Nutrition mix as the primary food for your herbivores or omnivores, then you should not be adding any additional vitamins or minerals to the reptile's food other than she may direct for certain situations or as directed by your reptile veterinarian for gravid iguanas.

BASIC SALAD RECIPE

While the proportions of food types remains the same, the actual amount of the food you make will increase as your iguana grows bigger and consumes a greater quantity of food. The following recipe makes approximately 3.5 cups of Basic Salad:

1/2 cup shredded green beans
1/2 cup shredded squash
1 medium parsnip, shredded*
1/4 cup minced fruit
Alfalfa**
Multivitamin and calcium supplements

* If parsnips are a seasonal vegetable where you live, you can use 1/2 cup shredded asparagus, trading off with 1/2 cup drained, rinsed, and chopped canned cooked lima beans, plus additional calcium to make up for the lousy calcium:phosphorus ratio in beans. Cooked beans are acceptable for short term use only due to their phosphorous content and other chemicals that can impede the uptake of minerals and trace elements. Asparagus is comparable in protein to parsnip, but does contain oxalates, so should not be a long-term staple.

** The quantity of alfalfa you use will depend upon the alfalfa product you are using. You want to add about 15 grams of protein. That is about 1/2 cup of alfalfa rabbit pellets, or about 1/4 cup or less of alfalfa powder or leaf tea.

Be sure to prepare the foods in very small pieces, finely chopped, minced or shredded, as appropriate for the type of food. The smaller the pieces, the more they can fit into their stomachs, and the more efficiently it can be digested. The salad, however, does not need to be pureed to a mush. While individual iguanas may eventually develop a preference as to the size of shred/mince they prefer, most do fine when the shreds or mince are about the size of cooked white rice grains. [14]

Serving the Salad

Make the salad accessible. Another common mistake new iguana owners make is to buy for their tiny hatchling the food and water bowls typically sold in pet stores. These bowls are so tall that the iguanas cannot easily see into them, let alone get to the contents. The result is that it can take longer for the iguanas to figure out that there is something for them in those bowls. Given that this is a highly stressful time for iguanas, there is no reason to add to that stress by using inappropriate servers for their food and water.

Serve the salad on a plate, jar lid or, for larger iguanas, in wide-mouthed shallow bowls or crocks, with the leafy greens piled nearby.

Some iguana keepers use paper, foam or plastic plates so that the iguana can get right up to (and into) their food. Be careful using paper plates as, when soggy, they are easy to tear and the iguana may end up eating pieces of the paper. Foam plates have no defense against a juvenile or adult iguana's teeth, which are easily able to tear pieces off, intentionally or otherwise.

The best option, is a plastic plate. Sturdy plastic plates, designed to be used indefinitely, can usually be found in the houseware aisles of most supermarkets and super-drugstores such as Long's and Walgreen's.

Serving Size

Experience will tell you how much of the salad and greens to offer. Hatchling iguanas appear to eat very little, so start them off with a tablespoon or so of mixed salad and a small pile of greens. If they finish eating what you feed them in the morning feeding, give them a little more. When they regularly eat and finish their second serving, increase the amount you give them in their first serving.

Some iguanas of all ages will graze again in the afternoon, especially during warmer weather. Some hatchlings will come down at night and eat a little. Try putting some fresh food out in mid afternoon or early evening to see if your iguana is interested. Once hatchlings are a couple of months old and acclimated to you, they will stop coming down for midnight snacks.

Iguanas will eat less in the days just before and after their shed starts, an event that occurs on average every 4-6 weeks. They will also taper off during the winter months, and during breeding season. Please read the articles on Reptile Skin Shedding and Breeding Season Basics to find out more about the behavioral and other changes associated with these periods.

Picky Eaters

As with humans, picky eaters are made, not born or hatched. With hatchling iguanas, and iguanas who have been allowed to dictate what they will and will not eat, it can be a nerve-wracking, hair-pulling experience to try to get them to eat what you want they should be eating. As discussed above, you cannot rely on the iguana to make sound food choices for itself. Neither can you give in to them when they refuse to eat the food you are serving.

With the possible exception of figs and bananas, wild iguanas don't have access to the food we have to offer them. The leafy greens we offer at least *look* sort of like wild iguana food, but they don't smell or taste the same. As for the mixed vegetable/alfalfa/fruit salad, it looks like nothing the iguanas eat in the wild.

As a result, many hatchling iguanas refuse to eat the salad because they do not recognize the salad as food. Others tentatively taste the greens, and then pick certain types of greens to eat, ignoring the others. While that isn't the end of the world if the green happens to be dandelion or collard, it is a problem if that green happens to be romaine or one of the lettuces.

If you find the iguana is eating the greens and ignoring the salad, serve the salad in the morning and offer the greens in the afternoon after the salad has been eaten. It may take several days or weeks before the iguana will actually eat the salad, especially if you have previously caved in to the iguana's "hunger strike" tactics by giving in and going back to feeding the food you have trying to get them to stop eating exclusively.

For more information and suggestions on dealing with these picky eaters, please read the Picky Eaters article.

LEAFY GREENS

Besides being nutritious, the dark leafy greens are also "fun" food. They are the closest we can get to give the iguana food that resembles the leaves they consume in the wild.

While some books and caresheets instruct the owner to cut the greens in small pieces, I prefer to leave them larger, about the size of, or a little bigger than, the iguana's head, and serve them by themselves in a heaping pile. You can also provide a bit of natural feeding by hanging up a whole leaf or two from the top of the enclosure so that it dangles inside, and let the iguana grab and tear at it as he would in the wild. Use a binder clip or get a clip made especially for birdcages. In glass enclosures, try a self-stick suction cup with a hook on the end on which to hang the clip or screw or nail a hook into a wooden enclosure. Make sure to use cork or rubber caps to cover the sharp ends of the hooks and nails.

Use two or more of the following greens daily: collard, mustard (including flowers), dandelion (including flowers), escarole and watercress (note that these greens are in addition to the alfalfa added for protein and fiber). Many markets carry (or will, if you ask them too) dandelion greens.

Dandelion is the best of the greens. You can use wild-collected dandelion greens and flowers if you are positive they have not been subjected to pesticides, herbicides and other toxins. Any dandelions growing by the roadside should not be considered as fit for consumption due to the toxic systemic and topical residues of vehicle exhaust.

Use romaine, green leaf and red leaf only in emergencies, and then only for a very limited amount of time. They are also good for adding moisture without adding much in the way of protein, useful when helping dehydrated iguanas or iguanas with acute or chronic kidney failure. Although these darker lettuces are more nutritious than their paler cousins (head lettuce, butter lettuce, Boston), it's not by much. Don't even bother with head (iceberg), Boston and butter lettuces--they lack nutrients and for some reason iguanas often become hooked on them to the exclusion of other greens.

Food Tips and Tricks

While most large urban centers are blessed with an amazing array of fresh produce all year long, many iguana keepers are not so lucky. For those who lack access to such abundance, here are some suggestions.

Asian markets are a good place to find greens like mustard and pea vines.

Winter squash and carrots can usually be found in the frozen foods section of the market. For short-term use, you can use high quality baby foods. Jars of squash, carrot or sweet potato are generally all to be found in the baby food aisle. Frozen peas or green beans are widely available all year long, as are pea and green bean baby foods. Frozen berries are another widely

available food stocked all year, and can be found in many baby food lines. Baby food pears and apples are commonly stocked, as well.

While baby foods are very helpful to have in a pinch, they should not be used as a regular part of the long-term diet. Don't be shy about asking your produce manager to carry some of the foods you need on a regular basis. Also, venture out and check out other grocery stores--often one or two stores carry more produce than do all the other stores in the same area. And don't be shy about asking for help identifying foods that are there.

You can try including a little of your leftovers but you need to exercise care in which leftovers you choose. In very small amounts, rice, plain chopped cooked noodles, and breads can be mixed in with the salad. Keep in mind that not only do these foods have a lousy calcium:phosphorous ratio, but some contain purines that can, over the long term, cause kidney damage. Some also prevent the uptake of certain vitamins, minerals and trace elements. Use grains only in very small amounts and only as occasional additions to the salad, never as a replacement for any of the recommended plants in the Basic Salad or the leafy greens. While you can boost the calcium supplement a bit to counteract the high phosphorus content of these foods, you can't counteract the other nutrition-related problems they cause.

Keep the salad dressings, cheese, fatty sauces, and spicy or sugary foods for yourself: iguanas can develop bad eating habits and junk food addictions just as easily as people...and they are just as difficult to correct!

Keeping The Food Fresh

The iguana salad and greens will start to wilt and spoil in the heat of the enclosure. You can keep the food fresher longer by making sure to place it in the coolest part of the enclosure.

Be sure to throw away (or compost) any food leftover at the end of the day. Wash the food bowl out with hot, soapy water, rinsing thoroughly before reuse. Many iguana keepers have two sets of water and food bowls so that they can save time in the morning by using the clean ones to put out the fresh food and water, putting the previous day's bowl in the sink to soak in soapy water after emptying the contents.

If you find the food spoiling well before the end of the day even when placed in the cool end, first check your temperatures to make that the temperatures are where they are supposed to be. If it is still spoiling, you can set the bowl of food in a larger bowl of ice. You can also freeze some salad in ice cube trays and serve a mixture of salad from the refrigerator and one or two iced salad cubes. The frozen salad will take a while to defrost and will keep the rest of the salad cooler in the mean time. You might also want to check out some other markets, or read up on how to select the freshest produce. Don't be embarrassed about asking questions, either: type information isn't something typically taught in school! Also read up on how to properly store produce in your refrigerator if you have to store it for a couple of days before you are able to make the Basic Salad and prepare the greens. How you are storing them may be prematurely aging them and so resulting in an abnormally rapid spoil rate.

Hand-Feeding

Be careful when hand-feeding iguanas. While that is often a good way to get a reluctant iguana to eat or to try a new food, they can easily become used to hand feeding and will refuse to feed from a dish. Many iguanas quickly realize that only accepting food from your hand is a great way to manipulate you. The end result is that the iguana, not the human, gains the upper hand in the relationship.

Iguanas who only accept hand feeding cause another. It is hard enough to find a suitable caretaker if you have to go out of town or are otherwise unable to provide the primary care, including feeding, for your iguana for a long period of time. Many temporary caretakers are too nervous or afraid of iguanas to put themselves anywhere near the iguana's mouth, let alone to actually sit there and try to hand feed the iguana for 20-30 minutes..

Your being away, or a major changes in the iguana's daily routine, such as the one that results in your being away or otherwise not involved with his daily care, causes enough stress to

induce behavioral changes. Many iguanas go off their feed during these times, while others will eat, but not their usual amount. You are ensuring that your iguana will not eat if you permit him to train you to feed it by hand only. (More information on stress will be found in the Change-Related Stress article.)

Iguanas often do not accept new foods when they are first offered. It may take several days, even weeks, before they realize it is food or will try to eat it. This is one reason why vegetables and fruits should be finely chopped, grated or shredded *and mixed thoroughly together*--it makes it difficult to pick out the "good" bits.

Iguanas' food tastes change over time, just as people's food tastes change. A food that used to make the iguana leap across the room may fall out of favor only to be replaced by a previously detested food. The same is true when offering hibiscus, nasturtium and geranium leaves and flowers, rose petals and dandelion flowers.

The rule is, don't give up. Essential foods can be mixed in with the salad. Fun foods, such as flowers and leaves, can be offered now and again to see if there is any change in their appeal.

When an iguana is self-feeding without any problem, you can feel free to offer treats by hand. Hand-feeding treats is a way to reinforce the iguana-human bond through a fun and rewarding interaction, though the perception of what exactly the reward is may be very different for the iguana than for the human!

Feeding iguanas is kind of like keeping iguanas. There's a lot to do and learn initially, and it may take awhile to develop a pattern, but when done consistently it will become automatic and will leave you more time to enjoy your iguana rather than merely maintaining him.

FEEDING TIME

I have found that many people wait until they get home from work, in the late afternoon or evening hours, to feed their iguanas. Iguanas are diurnal animals who forage, eat and begin digesting the day's food during the mid-day hours, not during the cooler nighttime temperatures. A hungry iguana may well eat heartily at night, but much of the digestive processes are delayed, hampering the body's ability to process the maximum amount of nutrients available for uptake. The end result is night eater isn't getting as much as he should, and that will be reflected over time in slowed growth, development and stress-related health problems.

Caring for iguanas and other exotics properly involves our having to adapt our lives to their needs. When it comes to feeding daytime eaters, it means getting up earlier so that you have the time you need to prepare and serve their food. Preparing a week's worth of food at a time will save you time in the morning because then you just have to dish it out and put the fresh food and water in their enclosure or feeding area.

If you can't get food in there in the morning, arrange to have another family or household member to it. There are not a few iguana owners who work swing or third shift, come home, fall into bed about the time others are just getting up for the day. But they set their alarm so that they can get up, feed and clean the iguana enclosure, and spend some time with the iguana before going back to sleep. If you can't or won't do this, and there is no one else in your home who will do this, seriously re-think keeping an iguana.

By way of example…

I met a woman eight years ago. She had a female iguana who had already suffered from serious burns and the loss of part of her upper jaw caused by the way the pet store housed the iguana. The woman is a night owl, that is, she gets up around noon, goes to work, is up until 4-6 in the morning, awakening again at noon. She didn't want to be bothered by actually shopping and making the Basic Salad, so fed her iguana the defrosted green bean, diced carrot and corn vegetable mix most markets sell. She bought collard greens, and later grew some of her own collards and squash.

The iguana sometimes got fed just before noon, but most often feeding was in the evening. She had ongoing health problems related to her jaw injuries. Not being handled a lot, she was never really comfortable with her owner though she would settle down quickly with me. When

the iguana stayed with me for a few days, she ate well at the right times, was more calm and very interested about her temporary surroundings. The iguana grew, reached sexual maturity, and developed and laid eggs a couple of years. But she was always undersized for her age, always edgy, and never thrived.

Several years, a couple of jaw surgeries and an emergency spay later, the woman decided that due to her increasing arthritis--and really having wanted a cat for a long time--she would adopt out the now 9 year old iguana and adopt a cat. She found a home for her iguana in a nearby town, a family who was familiar with my website and iguana diet recommendations.

The iguana has been in her new home for about nine months. She is more active, more sociable, keeping a normal day/night schedule--and she has grown 3 inches STL.

Water

Many books state that iguanas don't drink. Iguanas do.

Other books say you should put a bowl of water in their enclosure only for a limited period of time, such as for only one-half hour a day. Unfortunately, since the iguana can't tell you when he is thirsty, your designated water period may not be when he wants to drink, is still in resting mode, or is not warm enough to come down to the water bowl. It's also just plain lousy pet care advice and practice, regardless of the species.

Most drinking is done at the time they come down to eat. Since iguanas may eat more than once a way, water should be available the entire time, as well.

Most iguana keepers keep a bowl of water in the enclosure at all times. This not only makes it available to the iguana whenever the iguana wants it, it also helps, in a small way, to increase the humidity in the enclosure. The larger the surface area of water, the more rapid the rate of evaporation.

As with the food bowl, make sure that the iguana can see into and safely reach the water in the water bowl. It should not be so deep that if he falls in he will drown if he panics or he can't get out. A boiled rock can be placed in a large bowl to give him something to stand on. A ramp on the outside of the bowl, leading up to the rim of the bowl, can be installed temporarily until the iguana gets big enough to not require its use. Make sure that the ramp outside the bowl, and the rock inside, is secured so that they can't easily be moved around and cause accidental injury.

Water bowls, and the water in them, tend to get scummy after a while. Even though you use fresh, clean water and replace it every morning, the bowl itself will develop a layer of scum. To prevent this, wash the bowl daily with hot, soapy water, rinsing it thoroughly before reusing. Disinfect the bowl weekly, rinsing thoroughly before using again.

Pooping

As new iguana owners soon learn, *pooping* and *poop* are the terms most iguana people use when referring to the act and product of defecation.

Many iguanas will defecate in their water bowl. While this makes it very easy to keep his enclosure clean, it does present a problem in that the bowl needs to be removed as quickly as possible and replaced with a fresh bowl of water. The dirty bowl needs to be washed thoroughly and disinfected before being reused.

Iguanas are excellent swimmers and will frequently poop while partially or completely immersed in water. Try putting a large tub of water, one big enough for your iguana to get fully into, in the cool side of the enclosure. Place the drinking water next to the food bowl.

An alternative is to get up a little earlier so that you can run a bath and let your iguana bathe and poop in the bathtub. You will need to clean and disinfect the tub afterwards, but this can be easily incorporated into your routine when you keep everything you need handy in the bathroom. You will find more information on these subjects in the Swimming: Not Just A Bathroom Activity and the Cleaning and Disinfecting articles.

PART 5: TAMING & SOCIALIZATION

As you read the information, techniques and recommendations in this section, and as you live and interact with your iguana over the next decade or two, please keep the following points in mind:

- Iguanas are not domesticated animals. They have not, like dogs, cats, cattle, horses and other domestic farm animals, been selectively bred for traits such as docility and reduced aggression.

- Iguana "farms" are no different than puppy mills, existing solely to turn out hundreds of thousands of hatchling lizards as cheaply as possible. The individuals who work at these farms, and those who handle iguanas, packing and unpacking them, do so as quickly as possible, often injuring the already terrified, highly stressed and usually sick iguanas.

- Iguanas do not have any innate trust of humans; indeed, their experience before reaching you has taught the majority of them that humans are to be avoided at all costs.

- Any animal with teeth or a beak can and will use them if they feel that biting is the only way to get their message across.

- No matter how tame an iguana becomes, he is still a wild animal and has the instincts and responses of a wild animal. That means, when frightened or feeling cornered, the amygdala and hippocampus kick in, triggering the fight or flight response. Most wild animals seek first to flee. Only if they feel there is no other way will they fight. With iguanas, that means first using body posture and open mouth threats and hissing. If that doesn't work, they try to free themselves using "alligator rolls" or thrashing and wriggling to escape from whatever is holding them, employing their tails to whip and claws to scratch, if they aren't let go. If that second line of defense doesn't work, they may resort to biting.

- A highly tamed and socialized iguana who is in pain, or who is frightened, or startled may react with claws, tail or teeth, just as an overfed, lazy housecat may hiss and rake his unsheathed claws if startled awake.

- Some of the worst, most injurious bites reported by iguana keepers were from their own highly tame and socialized iguanas who were typically not aggressive towards them.

Many children--including teenagers--do not like being scratched. They won't even tolerate the feel of the rough, often sharply projecting scales on many adult iguanas' bellies and legs. This is why children, as much as they may want to, are not good at handling juvenile and older iguanas. This contributes to the almost universal loss of interest in their iguanas exhibited by preteens and teens. Loss of interest by the child is the leading cause of iguanas being dumped on rescues and animal shelters, or (illegally) set loose in parks and other areas.

All this being said, the tamer the iguana is, and the more highly socialized the iguana is, the risk of such reactive responses is greatly reduced. The better you learn to read your iguana, the better able you will be to spot problem behavior and avoid being hurt. The more you learn about and recognize those behaviors that signal the onset of shedding, breeding season, or that are signs of underlying health problems that requires veterinary intervention, the better you will be able to avoid injury and help your iguana.

Iguanas are not mean and nasty. They don't hate you. Hatchlings, and most rescues, have been ill-treated by the humans with whom they have come into contact. Thus, the three most important jobs a new iguana owner has are:

- getting the iguana set up and feeding properly;

- start working with the iguana to tame him; and

- getting the iguana checked out by a reptile vet to make sure he is healthy and, if not, to make him so.

Domesticated vs. Wild Animals

Dogs and cats, other species of small mammals and some species of birds, have been bred in captivity for generation after generation. They have been selectively bred--intentionally or otherwise--to exhibit certain traits that humans like or found useful: docility, appearance, and their adaptability to *our* habits and preferences, and the repression or reduced expression of many of their natural tendencies. That is part of the process of domesticating animals.

Wild animals who are captured and brought into captivity, and those who have been bred in captivity without any selection for behavioral or adaptive traits, and those who were merely hatched/birthed in captivity (not "hand-fed" or "hand-reared"), will not have the same response to captivity that domesticated animals have. These wild animals and offspring of wild animals still have the instincts of wild animals. They have the suspicious nature and the reflexive responses of wild animals. These responses result in constant stress no matter how well adapted the animals appear to be.

A wild animal who is kept captive for the rest of his life who never becomes comfortable interacting with his primary caretaker is an animal whose level of stress can ultimately lead to illness, harmful stress-induced behaviors, and increased risk of infection and injury. When injured, the treatment causes even more stress, often leading to re-injuring or causing new ones. An untamed animal is always on edge, his tension increasing whenever humans are present or when it looks like the human is going to initiate contact or even just enter the enclosure to service it.

All of these things can lead to a shortened lifespan. We tend to think of animals in captivity as living longer as they aren't preyed upon and injuries and illnesses that they might not survive in the wild can be successfully treated in captivity. And this is true for animals who are kept properly in captivity, and who are well comfortable with their interactions with their keepers. For animals who are not cared for properly, or for whom keeper interactions increase their stress levels, the stress can ultimately kill.

Rationale for Taming Iguanas

An iguana who is never tamed becomes stressed each time it sees or is forced into contact with the main object of stress: humans. An untamed iguana is no fun to interact with and a vicious cycle is established, with the iguana running away. When caught, he scratches, lashes and even nips or bites in order to try to get away once again.

As most owners of untamed iguanas cannot hold onto them long enough to trim the iguana claws, the owners either stop trying to hold the iguana or resort to using enormous, or enormously thick, gloves. This not only scares the iguana even more, but also can cause injuries, as the gloves are often too thick for the human to be able to accurately gauge the pressure being put on iguana bones.

When the iguana has a calcium deficiency, broken bones are all too common. As most vets prescribe complete inactivity and the removal of all cage furnishings during the recovery period, an already barely tamed iguana becomes totally wild by the time the bones are knit back together and it is time to remove the bandaging.

The above scenario is certainly no fun for the humans who may have gotten their iguanas because they fell in love with someone else's highly socialized iguana. More importantly, it makes life miserable for the iguana. Life may also become miserable for the humans as the iguana gets older--and bigger--and decides to start taking over the household by force and intimidation.

Most of the phone calls, emails and posts I read, and house calls I make, are related to untamed iguanas. Most of the iguanas dumped on rescues are dumped because they are untamed. At best, some of these iguanas are barely tolerant of very short episodes of human contact. The reason most often cited for getting rid of older iguanas is that they are "difficult" or "impossible" to deal with, or the owners start feeling guilty for leaving the iguana locked in a cage day after day while it glares out at them every time they walk by.

The worst off are those iguanas whose enclosures are moved into dank, cold garages, with no contact or visual stimulation other than when food and water are put in.

It is not an impossible task to tame and socialize iguanas. It does take time, it will involve the loss of some skin (yours), some sleepless nights (yours) and some occasional despairing thoughts (yours). On the flip side, there will be increased mental and physical health (yours and the iguana's), increased interest in the surroundings (the iguana's), and an opportunity to teach your children and others how to get to know and interact with another living being.

WAIT AND SEE

There are some iguana keepers who advocate not doing anything to tame an iguana, asserting that iguanas will become tame all on their own if you just leave them alone other than to clean the enclosure and feed them.

The problem with this method is that while some iguanas do become tamer after some time, often ranging into several years after acquisition, most do not. Ask any iguana rescuer how many older completely untamed iguanas they take in every year. Worse, ask those animal shelters and vets who have euthanized completely untamed older iguanas because no home could be found them and there was no more room at the rescues and shelter.

A person shopping for iguanas, or considering, as their first iguana, taking over someone else's cast off pet, cannot tell just by looking at an iguana whether he is one of the very few who will, over time, become tame all on his own or if he will not. Because untamed iguanas are under more acute stress for longer periods of time than an iguana being proactively tamed, proactive taming is the more humane alternative, despite being more stressful for the human.

In fact, proactive taming of animals has become widely accepted by those who routinely work with wild animals far more dangerous than green iguanas: zookeepers.

Behavior Modification

The taming process can be described as the animal and human learning to modify their initial reactions to each other and begin to learn how to communicate, usually nonverbally, with one another. Taming is behavioral modification the goal of which is to make the animal's life and encounters with humans less stressful to the animal, be it an elephant, alligator chimp, killer whale, or iguana.

When you go to a zoo and see the keeper signal the elephant to lift its foot, that isn't a trick for the amusement of zoogoers. It is a behavioral modification developed so that the keeper and zoo vet can more easily inspect the elephant's feet to ensure there are no injuries or infections and to be able to clean or trim the elephant's pads when needed.

Bird shows are also behavior modification in action. Parrots imitate animal and other sounds in the wild as well as in captivity. Thousands of hours of signal-behavior-reward go into each of the show's "stars" who talk to the keeper, fly out to the audience and pluck a dollar bill from a volunteer's hand, or demonstrate their flying and stoop behaviors.

Behavior modification assists communication between the keeper and the kept. While this communication--the ability to read and cause a useful action or reaction--can help ensure that the captive animal will enter into a long-term relationship with its keeper, this is not always the case.

Some captive species, whether or not they are tame, do not physically pose much of a threat to their human keepers. Other species can and do, even when highly tamed. That is the reason why so many lions, tigers and leopards are dumped on rescues, abandoned when the owners move, or confiscated by city or state authorities when the owners can't care for them any more. While that roly-poly cub may be awfully cute, the burning pain of an adolescent lion's claws slicing through your skin, the underlying muscle and nicking the bone beneath sort of supercedes that cuteness. Iguanas may not be as impressive in size as a big feline, but they are just as capable of landing you in the emergency room and your becoming all-too well acquainted with the local plastic surgeon.[9]

TAMING VS. SOCIALIZATION

Taming and *socialization* are the two terms I use to differentiate between two different levels of behavior modification and adaptation to captivity.

Tame

A tame iguana is one who doesn't stress out at the sight of his humans or when the caretaker approaches and enters the enclosure or area to perform essential tasks. The iguana tolerates being picked up without much squirming. He does not thrash, tail whip, gape, hiss, laterally compress his body, flare his dewlap, bite, or scramble frantically to get away. He tolerates having his body, including toes, tail and dewlap handled and inspected. He doesn't fuss--very much--when you clip his claws, clean his enclosure, remove his old food and water and replace them with fresh.

The iguana is comfortable with the daily routines of feeding, cleaning, and shows no signs of distress or rejection of being touched or handled by the caretaker, though he may not show signs of actually enjoying being petted. He may even follow with some interest the comings and goings of family members, visitors, and other household pets.

A tame iguana may not be happy about being placed in a carrier to be taken to the vet, but he will be calm once he is in the carrier and in the car. He will not become overly stressed when presented to an experienced reptile vet for examination, or fight the vet or staff when being held and handled as necessary for a complete external physical examination.

A tame iguana will permit his head, neck and shoulders to be petted or rubbed. He may also be willing to take foods offered by hand from a caretaker or a family member with whom he has developed some level of familiarity.

How Long Does It Take

Individual iguanas will vary, just as their owners will vary. Some iguanas respond quickly (though it may not seem like it to the person doing the taming) to being handled. They learn more rapidly that if they stop struggling, they will be put down faster. They are faster to realize that even though they may not be put down right away, being held isn't as bad as they initially thought it was. Once they settle down in the hand and become more comfortable being held, they start to pay attention to the things around them. By the end of the first year, they view being taken out of their enclosure as something to look forward do, and will fiercely resist when you try to put them back in.

There is also a learning curve for the humans who are doing the taming, a curve that is usually far steeper for the humans than for the iguana! Humans are fighting instincts that are often just as strong as those guiding their iguanas.

The instincts in humans are in place to avoid getting injured themselves, and to avoid injuring another. This means that the human trying to tame an iguana must fight the instinctive reaction to let go of the lizard when the lizard scratches, whips its tail, gives an open-mouth threat, or nips the human. At the same time, the human is fighting the instinct to let go because they don't want to hurt the lizard as it struggles to free itself.

While these two instincts are setting off the alarm bells in the human's head, the human is also dealing with the fact that, having never tamed or even held an untamed lizard before, the human hasn't a clue how to hold the iguana that doesn't want to be held.

Unspoken questions fly through the iguana keeper's head: Are they hurting the iguana? Not holding on enough? Stressing the iguana out too much? Should they be doing something differently? Arrrgghh! It all becomes too much to deal with and so they bow to instinct and put the lizard down.

Big mistake.

The first round ends and the score is posted. Iguana: 1, Human: 0.

Working with any animal you have never worked with before, or taming a species you have never tamed before, is just as scary for the you as it is for the animal. The calmer you make yourself act and respond, the calmer you will feel. Just as agitation and nervousness can be communicated to animals and affect how animals respond to you, so, too, will your feeling of calm

be communicated to the iguana. Taming takes patience and perseverance…and an average of 6-9 months for the experienced and inexperienced tamer. Unless you have been pregnant, this will likely be the longest nine months of your life. The reward--a tame iguana who doesn't fuss while being worked with--is well worth the effort.

Socialized

A socialized iguana is all of the above and much more. A socialized iguana clearly enjoys being with people. Instead of exhibiting no color change, or a change to stress colors (dulling, brown, gray or black), the iguana's colors intensify, even lighten, turning to what many iguana owners call their iguana's "happy colors". These are the colors that an iguana displays when he is particularly contented or feels dominant in a situation without any actual confrontative or aggressive behavior or intent.

Another sign that the iguana enjoys the petting is by leaning into your hand, or raising himself up so that you can more easily give their heads, necks, throats, or chest the attention they want. Some iguanas lean over so far and get so blissed out by the petting that, if you move your hand away, they will stumble, even fall over. If your iguana is one who relaxes so deeply into his petting session, be sure to support his body with your hand, giving him time to become aware of the fact that the petting session has ended so he can straighten up again.

A highly socialized iguana will sometimes seek out his caretakers, family members, even other household pets such as dogs and cats, to "hang around" with them, or to solicit food treats or petting. Socialized iguanas may climb into your lap for a nap or a friendly sneeze in your ear. They may gently head-butt you when they want to be rubbed or held.

A socialized iguana likes going out of the house and going to new places, or return to old places where they got a lot of positive attention. They are interested in watching the sights go by from a favorite basking perch in the car. They enjoy meeting new people, especially when those people lavish the proper attention (lots of petting) on them.

Socialized iguanas are attention hogs when they visit a classroom to help teach students about iguanas. They watch the kids with as much interest and bemusement as the kids watch them.

Socialized iguanas are comfortable out in public, calmly dealing with lots of people, activity, and conversation. While some noises, such as air brakes, truck horns, train whistles, sirens and other loud but less frequently encountered noises may initially elicit a startle reaction from them, most become acclimated to hearing them if they hear them often enough.

Highly socialized iguanas are those that people see and fall in love with and want one of their very own, not realizing just how much time and effort is involved. This can be a good thing, as it helps people learn that just because iguanas get big doesn't mean that they are nasty. But it is a bad thing because seeing such highly socialized iguanas is one of the main reasons why so many people rush out and get an iguana without finding out what it takes to get them big, healthy, tamed and socialized.

Can every iguana be tamed and socialized?

While every iguana may not have the capacity or interest, for lack of a more precise term, in the type of willing cooperation required to become highly socialized, they can *all* be tamed. By "tamed", I mean your iguana will let you do interact with him so that you can take care of him properly without his getting all thrashy, or freaking out, or going for your throat or whatever part of your body is within range. Being under less stress means that he will, overall, be healthier. A healthier iguana is less prone to stress-related abscesses and injuries and so need less veterinary care than a completely untamed iguana, though he may still need to see the vet more often than a socialized iguana.

If you get your iguana with the understanding that he may not turn out to be a sweet and cuddly pet, but you are willing to do what is required to establish a good working relationship based, ultimately, on mutual respect, then you will both benefit. If you keep working on the

interactions needed for socializing an iguana, and the iguana becomes socialized, as most do, then the effort you have put in will be well worth it.

Is it ever too late to tame or socialize an iguana?

If your iguana is already several years old and has never been tamed, it is not too late to tame him. If you acquire an iguana who is marginally tame, that doesn't mean that, worked with properly, he won't become fully tame and, if you persevere, socialized.

I have found that, regardless of the age of the iguana, the process of taming and socializing is essentially the same. The biggest differences have to do with the size of the iguana. Larger iguanas are bigger, stronger and heavier. They have rarely, if ever, had their claws trimmed. Their head is bigger and jaw muscles stronger, so their bites have more serious consequences.

Because your iguana is bigger and stronger, you don't have to hold back as much as you do with a tiny hatchling. It is the holding back that usually results in the iguana getting away from you, or you putting him down sooner than you should.

The urge to let them go is a sort of ingrained fear or caution when we handle small, fragile animals. This is not a bad trait, as it most likely relates to our species's inborn feelings of wanting to protect and nurture human babies and is often extended to the young of other species. It is a wonderful trait to have, but you have to observe yourself to see where it is interfering with your ability to tame an animal.

There is a line between being excessively careful and careful. You do need to be careful in how you pickup, hold, and put down any animal you are taming, but you can succeed in taming your iguana while still being careful. Being excessively careful generally results in an iguana barely or not at all tame.

Regardless of the age or size of the iguana, you will have to buckle down and devote the necessary time and effort to the process. Taming any animal usually involves training (or re-training) the tamer. People who are trying to tame iguanas often need to unlearn some counterproductive behaviors and responses in order to be successful in modifying their iguana's behavior and responses. Don't hesitate to ask for help from people who have highly socialized iguanas. Often, they can see things you are doing that are prohibiting you from being an effective tamer. The problem may be in your tone of voice, gesture, posture, or actions before, during or after holding the iguana. You will find most successful iguana keepers are more than willing to help you perfect your taming skills, as they know all too well that a highly tame and socialized iguana is far less likely to be dumped on an already over-crowded rescue or shelter.

Iguana Psych 101, or The Pavlovian Training of Humans

In the wild, iguanas are somewhat social animals. For the most part, they can be said to live in social groups, with their primary living area being high up in the trees. They bask in available patches of sunlight, and may go foraging together. Amongst herbivores, there is little competition for food when food is plentiful. As long as there remains a lush forest without significant variations in normal seasonal fluctuations, there is plenty of food for the iguanas.

While there may be little in the way of food competition, there are other resources for which iguanas compete with other iguanas. Depending on their sex, age, social and breeding season status, iguanas compete for territory and for prime basking areas. During the transitional period between the seasons, they may compete for the more limited food resources. During breeding season, males compete with one another for access to females. In areas where suitable egg-laying conditions are scarce, female iguanas may aggressively defend their egg-laying site.

Males are the most competitive, with adult males vying for the alpha position - the best basking perch, the biggest territory, the most females. Females are only occasionally territorial, primarily reacting offensively when they wish to be left alone (in the wild, that is; they have been known to be territorial and dominant in captivity). Young males who are not yet ready to take on mature males may hang out with dominant males who permit them to be in such close proximity.

THE DOMINANCE HIERARCHY

There are essentially four positions in the male iguana dominance, or status, hierarchy. Greatly simplified, they are as follows.

- The alpha male is dominant over all other males in his area and, to a limited extent, over all of the females.

- The beta male is second to the alpha, tolerated as long as he doesn't get to uppity with the alpha. He has attained this position by being alpha to all the other males in the area. Some of the higher-ranking gamma males may frequently contest his position. When in the presence of gamma and omega males, the beta's colors may intensify, with the stripes or patches becoming more vivid. The orange, rust or reddish colors associated with sexual maturity and dominance will get deeper in color and cover more of the surface area of the beta male's body during these encounters. When dealing with the alpha male, however, these colors will fade.

- Gamma males are ranged somewhere in between the beta and omega males. There may be frequent encounters between them as they try to gain increased status but by and large they co-exist relatively amicably. In captivity, given enough room (free roaming in a large house) they may form buddy-type attachments with a few of the other gammas, spending much of the daytime hours in each other's company. Gammas are typically tolerated by the well-entrenched alpha male, but find dealing with the beta male a little more risky.

- Omega males are at the very bottom of the social hierarchy. It is almost as if the omega is wearing a sign that says, "Feel free to attack at will". All of the other iguanas, including the gammas, will take a swipe at or bite the omega. The omegas tend to live on the periphery of a group of iguanas. Unlike the alpha, beta, and gamma males, they have no established territory. Interestingly enough, the one male who may occasionally tolerate the omega is the alpha. Since the alpha feels no threat to his status by the wimpy omega, he can be generous--outside of breeding season--in allowing the omega to spend time in his presence, often in close proximity.

Note: The term *alpha* is in common use when discussing the top-ranking animal in a dominance, breeding, or social hierarchy. Due to the lack of common terminology for lower rankings, I elected to refer to the other three identifiable iguana status groupings as beta, gamma and omega.

In the wild and in captivity, the omega males may be smaller than iguanas of the same age who have higher status. Because the development of their jowls and other secondary characteristics typical of sexually mature males may be delayed in the omegas, the omegas often look more like females. This decreases the likelihood that they will suffer an attack by another male of higher status. In fact, research on their femoral pore secretions finds that these omega males even smell like females to other iguanas.

Beta and gamma males are often quick to react to being bested by a more dominant iguana by turning around and finding someone of lower status they can intimidate or bite. This displacement behavior occurs in groups of captive male iguanas, as well. In captivity, this displacement may cross species lines. For example, a male iguana 'bested' by another species (including his keeper) may deal this loss of face by going off to tail whip or chase the family cat.

What About Females?

Female iguanas generally function as if they were outside the realm of male competitiveness. In the wild, females range widely, their territory often encompassing that of several males. Amongst themselves, at least in captivity, there can develop a hierarchy, with an alpha female who may determine who may or may not access certain basking areas or food.

Females are equipped with the same sharp teeth and claws that males have, and in general can hold their own with a comparably sized male. While their head bobbing patterns may

be different from males, the message communicated by the bobs, along with body posture punctuating by a loud click-hiss, is just as clear to a male iguana and other females--and humans.

That being said, one of the most common cause of serious injury and infection in females is due to being housed in too small a space with a male when breeding season starts.

A too small enclosure is a problem all the time, regardless of the sex of the iguana. The potential for severe stress, illness and serious injury is compounded when you put two or more iguanas in too small a space. In the wild, females have comparable n size to those of dominant males. For those people thinking that, by getting a female, they are getting a kinder and gentler iguana, find out the hard way that they have to work at least as hard--if not harder--to tame, socialize and keep females healthy as they do male iguanas.

If you decide to keep a male and female iguana in an enclosure or free-roaming area that is too small for them, you might as well just start writing out your checks to the veterinarian as soon as you see the breeding season colors start to appear.

Size Doesn't Matter

Some people think that the larger the lizard, the higher the status that lizard will attain within a group. The fact is that, to a certain extent, attitude plays a large part of how an iguana is perceived by his or her peers. A smaller bold iguana may successfully intimidate a larger iguana to the point where the larger iguana is not getting enough access to basking heat, food, or appropriate sleeping areas. Females can successfully intimidate males as well as females, making it impossible to predict compatibility using gender.

If you introduce, temporarily or otherwise, a large iguana into a smaller established iguana's territory (or into the home itself [10]), you cannot assume that the smaller iguana will be subordinate to the large one [11].

Your New Hatchling Is Already Tame?

When you first bring home your new hatchling, it is to be expected that he's not going to be very active for a couple of days. If he came from the typical pet store or expo vendor, then he has spent the previous several weeks in a too cold environment overcrowded with sick and stressed iguanas, fed little that he could actually eat. By now, the sad--if not infuriating--litany of abuse and neglect that is the hallmark of the exotic pet trade should be familiar to you.

However, if your iguana is still subdued and does not act like the thrashy, whippy iguana described above, it is more likely that you have selected a sick iguana, rather one that is tame. As all new iguanas need to be seen by an experienced reptile vet to be checked over and tested for internal parasite, you need to go, anyway. If you see your iguana is lethargic and does not act like a prey animal about to be captured by a predator, make that appointment sooner, rather than later.

YOU AND YOUR NEW IGUANA

When you first bring your iguana home, it reacts like most other small animals at the bottom of the food chain that find themselves facing off a predator they can't get far enough away from. They puff up to make themselves look bigger and scarier, lash their tails, and open their mouths so you can see how dangerous they are.

The same thing happens when you reach into your new iguana's enclosure. When showing you how big and fierce he is doesn't work, the iguana attempts to run away. When you do manage to pick him up, he whips his tail, scratches, and executes crocodile rolls--in short, doing everything possible to get away from you.

When he does get away, or when you give up trying to get him out of his enclosure, you will have taught the iguana that he can make you go away. The next time you go to get him out, he will act up again, often more vigorously than he did before, just in case he hasn't convinced you yet. When you go away yet again or put him down as soon as you get scratched or bitten, you will

have once again reinforced that behavior. You will also have contributed to his understanding that instead of being a predator, you are a wimp.

You do not want your iguana--male or female--thinking that you are a wimp.

It is at this point that most owners make their biggest mistake. They decide to wait until the iguana calms down. Some owners believe that once the iguana "settles in" or gets a little older, or the planets are aligned just right, their iguana will be tame. Not!

Instead of waiting and ending up with a nice, tame iguana, what they usually end up with is a 5-foot, 10-pound iguana that is just as wild and crazy as when they bought him. Now, however, he doesn't nip. He bites with 116 teeth set into very powerful, stubborn jaws. That stinging tail slap and the whippy tail becomes an armored razor-edged smack that can break the skin on your arm even when the sharp dorsal ridge doesn't actually slice across you. It begins to dawn that he is not yet full grown…and you start to get seriously worried.

Do give your new hatchling iguana a few days to start getting used to his new home.

Do everything you need to do to maintain his environment properly, feed and water him, clean up after him, and so on.

Do plan on spending time in proximity to his enclosure and talk to him, both in soft tones and in your normal tone of voice. This will give him a chance to observe you and learn to recognize you by sight, scent and voice.

Do put the time and effort necessary to taming your iguana to start. If you do not have the time, patience or perseverance to do it, then a green iguana is not the right pet for you.

One Is The Loneliest Number

Some primary caretakers develop a good, even great, relationship with their iguanas, but the iguana treats the rest of the household as if they were all omega males. The reason this occurs should be obvious. The iguana has assessed how the household members acted and reacted and has effectively achieved the highest status he can in these circumstances. The dominance hierarchy is:

Alpha:	Primary caretaker
Beta:	Iguana
Gamma:	May be one or more of the humans or the family dog or cat
Omega:	The rest of the humans

The primary caretaker in the person who has put in all the time and energy into working with the iguana to tame and socialize him. These caretakers can take their iguanas to their veterinarians and the iguanas win high praise from the vets and all the staff for their sweet nature. These caretakers can take the iguanas to school and the iguanas are angels with all the kids. In general, these iguanas behave like gentlemen (or -women) when introduced to new situations and new people.

At home, however, the rest of the family swears that the iguanas hate them.

Why Omega Family Members Are A Problem

This situation may seem like it is okay, but there always comes a time when, for some reason, the primary caretaker cannot do the caretaking. If this happens for a very brief time, say for a meal or two, or even a day or two, the iguana and gamma or omega family member will probably be survive without the human suffering too many scratches. If the primary caretaker is going to be absent or unavailable for a longer period of time, then the frustration levels of both the iguana and temporary caretaker will rise.

Considerably.

Especially if the iguana expresses his dislike of the situation and temporary caretaker by poop-painting his enclosure or having a food fight with himself.

If an iguana keeper lives alone, there isn't much choice in the matter. For those who live with other people, especially other adults, it is essential that at least one other person work as

closely with the iguana as the primary caretaker. At least one or more of the other adults and teens should have enough experience with the iguana to become comfortable working with and around the iguana--and the iguana comfortable being around and handled by them.

In a perfect world, people would never get sick, never need to go on business trips, dorms would allow exotic pets, and everyone would be able to take their iguanas with them when they go away on vacation. Unfortunately, we live in a far from perfect world, and amongst the imperfections is a dearth of experienced, knowledgeable iguana sitters.

Most pet sitters have had no experience--or no good experience--with iguanas. Most veterinarians, though well equipped to board dogs and cats, do not have facilities specially designed to board reptiles, especially large, arboreal, well-armed lizards who are acting out because they don't want to be there.

So, plan for life's realities, and make sure that you are not the only one who can safely and comfortably handle and work around your iguana.

For more information on what you can expect from your iguana, please read the Moving, Vacation and Boarding Stress in Green Iguanas article.

On the Other Hand…

The iguanas belonging to some owners and their families are well behaved, even highly socialized, with immediate family only. The iguana is very comfortable with the people who live in the house and may eventually come to accept other individuals who visit the home on a regular basis and handle the iguana. These beta iguanas--male and female-- are comfortable with their status in relation to their alpha humans.

When other people come to visit, however, those beta iguanas immediately set out to dominate the visitors. It's one thing for the iguanas to be beta to their alpha families, but no one else is going to be allowed such high status.

Their attempts to dominate may be relatively benign, such as walking back and forth, body high off the ground and laterally compressed, dewlap flared, tail lashing. Some iguanas may escalate their tactics into potentially injurious acts, including launching themselves at the visitors and biting them.

Children as well as adults are considered fair game. Human males may be at particular risk during the male iguanas' breeding season, as the human males may be seen as competition for territory and mates. Human female visitors may not be immune, either, especially if they are ovulating or menstruating at the same time as the male iguana's breeding season. For more information, please read the Male Iguanas in Breeding Season and Human Females and Breeding Season Basics articles.

TECHNIQUES, TIPS AND TRICKS

Iguanas threaten other iguanas, potential predators, other animals, and their humans, by using a variety of postures and behaviors. They stand tall with all four limbs extended to increase their height. They laterally compressing their body to make it taller. They stand sideways to make sure that the one being threatened sees how big they are. They enhance their silhouette further by tightening the dorsal crest to make it stand up taller. They also fully extend their dewlap out to increase the apparent size of their heads, which, from a distance, makes their subtympanic scale look like a giant eye.

Along with this posturing, tail lashing signals additional threat. The tail of a large iguana is capable of a stinging slap--even cuts and bruising--if it comes into contact with a sensitive part of someone else's body.

Their large deep pink mouth, with the dark pink forked tongue tip, and hissing is generally enough to keep whoever they are threatening at bay whether or not they bite. Many iguana keepers find, to their dismay, that their iguana has an amazingly flexible neck that can snake their head around to deliver a painful bite. "Push ups" and bobbing forequarters also warn of impending attack.

Stepping Up To The Plate

When you go to pick up an iguana throwing his entire repertoire of threatening behavior at you, it can be pretty scary if you've never dealt with it before.

For that matter, it's pretty darned impressive even for people who have worked with dozens of untamed and aggressive iguanas. This doesn't mean that iguana keepers who have lots of experience with untamed or aggressive iguanas aren't cautious or respectful of such iguanas. On the contrary, having experienced bites, deep scratches and skin abrasions from the rough scales, they know quite well the potential for harm. They just aren't freaked out by it, understanding it for what it is: a natural behavior that evolved because it was so successful in getting other organisms to leave the iguana alone.

So, while your normal (and understandable) inclination is to back-off-and-wait, don't. Just keep reminding yourself that an iguana and keeper need to mesh into a social unit where, if there is going to be a dominant organism, it is going to be the human, not the iguana.

Keep the iguana in hand as best you can, finding that fine line between holding him so tight that you cause pain or increase his fear, or holding too loose, letting him easily escape.

Let him roll around between your two hands if he starts crocodile rolling. If he starts to slither away or you need to reposition him, hold him with one hand against your body (preferably a body part with clothing covering it) then use your other hand to take hold of him again.

An effective technique that helps settle down a particularly persistent thrasher is to hold him in your hand and then raise your hand straight up, so your arm is straight and the iguana able to look down. He should settle down after a minute or so. When he does, lower him slowly back down until he is below your eye level. For an arboreal lizard, being up high gives him a sense of security. Holding up there until he calms down gives you both a sort of time-out.

With the iguana now back at or below eye level, talk to him for a few moments. If he does not start thrashing or rolling again, but remains relatively still during this time, then you can put him down. The iguana needs to start associating calm behavior on his part with getting what he wants. He needs to be clear that it was *your* decision to do put him down, not his attempts to get away from you that succeeded in actions forcing you to let him go.

If he gets away from you at any time during this process of your picking him up and his settling down long enough for you to make your point, you will have to pick him up again. You need to do this regardless of what it takes to do so, and repeat the whole process until he is settled down long enough for it to be clear that it is your decision to put him down.

Easier Said Than Done

It is easy for me to write "you should not put the iguana down even if you are getting bitten and scratched". It may even sound crazy, but it takes some nerve, patience and perseverance on your part, and a willingness to lose some skin, and maybe some blood, to work with an untamed iguana.

Speaking of bites, try not to jerk your hand away when you get bitten--this will actually make the injury worse than it might otherwise have been. If you are uncomfortable working with such an iguana initially, try to find someone in your area that is experienced in working with such iguanas and ask them to come in and show you how to do it.

Quite often, once the iguana has his first experience with a human who is not scared off (and who can hiss as well as he can), the iguana tends to have a whole new respect for our social status as a species. This ultimately makes your subsequent encounters easier unless the iguana occasionally decides to test you just to see if you are paying attention. But once you are at the point where he no longer routinely fights you, the taming and subsequent socialization progresses much faster.

Isn't taming cruel?

Some people take umbrage with proactively taming any animal, especially when the talk turns to the human being the "dominant" organism in the relationship.

When I talk about you needing to be dominant, of higher status, in relation to your iguana, this isn't animal cruelty. There is no force used, no pain inflicted, no breaking of the animal's will.

By proactively working with the iguana, you are doing what iguanas do in the wild: seeking to establish, preferably through intimidation and without drawing blood, your higher status. In a sense, you are learning to speak (through your actions) the language that iguanas use when communicating with one another. You may not have a dewlap or a long, expressive tail, but you can learn to speak some iguana.

If you have ever trained a puppy or a horse, or tried to teach a room full of children, you know that the first thing you need to do is to get their attention. Once you have their attention, you can go on from there. Getting an iguana to sit still in your hands, to start paying attention to you and what is going on around the two of you, instead of simply reacting frantically with the only thought being to escape, is just the way to his attention.

Making Attention-Getting A Bit Less Painful: Claw Trimming

While the claws on a newly hatched iguana aren't very long or thick, within a few months, they are capable of shredding through the outer layers of your skin. As they get older and bigger, their claws can slice through into muscle tissue, tear holes in your shirts and make a plain knit sweater look, well, interesting. You will need to trim the iguana's claws. Trimming the claws will not impair their ability to climb, as all you are trimming off is the very sharp extension that extends beyond the main claw.

Begin getting your iguana used to seeing and hearing the claw clippers once he has settled down a bit. You can even pet him with the clippers, and operate them so he can see and hear them move. When he is used to that, you can start making like you are clipping his claws, clipping air if they are still too small. More information on how to trim the claws can be found in the Claw Trimming article.

If your iguana is already a juvenile or older, you will want to trim his claws before you start working with him. Not only can he do some serious rearranging of your epidermis, his claws may catch in your clothing which can cause him to struggle even harder and may result in a broken bone or the traumatic loss of a claw.

If you aren't up to doing the first claw trim, and you don't know an experienced iguana keeper who can come do it for you, make an appointment with your vet to have it done. Since you need to take your new iguana to the veterinarian anyway, make sure to mention you will need some extra time for the claw trimming when you call to schedule your appointment. Chances are, they will want to trim the claws *before* the examination.

Iguana Scarification

No, this isn't some exotic decorative scarring ritual practiced by punk iguanas. This is what happens to peoples' arms and hands after they've been handling iguanas for a while.

Untamed iguanas, and iguanas who are aggressive or scared, can easily shred your arms. For that matter, a fully tame and socialized iguana who feels insecurely held will try to reposition himself in your arms, can leave behind parallel rows of bloody furrows.

People who ask what caused the scratches or scars on your arm seem to shrug it off if you tell them that your cat or rose bushes did it. If you tell them your iguana did it, you are treated to a chorus of "Why do you keep that nasty, vicious animal! I'd kill any animal if they did that to me!" or variations thereof.

The bottom line is that, with the possible exception of some fish and amphibians, if you work directly with animals long enough, you will eventually get bitten or scratched. With iguanas, it is likely to be sooner. There are, however, some things you can do to protect your arms.

Gauntlets

One creative iguana owner took a pair of thick, knee-high athletic socks, and cut off the toe box just above the reinforcing seam; this helps prevent unraveling. She then slipped it on so

her fingers extended through the hole. She marked where her thumb was, the removed the sock and cut out a hole for her thumb. She did the same thing with the second sock, and voilà! Instant soft, machine washable fingerless gauntlets!

Since sexually mature males, especially when in breeding season, consider green, blue, purple and bluish reds to be "iguana" colors and wearing these colors may trigger an attack, it is best to stay away from those colors when making sock gauntlets. If you must color coordinate your gauntlets to your wardrobe, have a pair of plain white ones to wear during breeding season and at other times you see that your color choice may be causing a heightened response.

Another enterprising iguana owner took this sock gauntlet one step further and created Ig Gear, producing fingerless gauntlets with finished edges in a variety of attractively patterned fabric.

Protective Clothing

Other iguana owners just wear long sleeved shirts. I have a heavy denim work shirt I wear when dealing with untamed iguanas. It holds up to slashing razor claws and can easily be put on over whatever else I am wearing. With larger iguanas, wearing long pants helps protect your legs from getting slashed or punctured by iguana claws, sharp leg and belly scales, and tail.

Even highly tame and sociable iguanas can leave deep scratches. Unless you are obsessive about putting on your long sleeved shirt or gauntlets every time you want to handle your iguana, you will eventually end up with some scratches. If the scratches are deep enough to draw blood, treat them seriously. Carefully flush out the wound and treat with a topical antiseptic and, as necessary, a topical antibiotic. More information on treating wounds can be found in the Human Health Concerns article.

Extracting Iguanas from Their Enclosure

When you reach inside the iguana's enclosure to catch and remove him, make sure you are well balanced. It won't do either of you any good if you lose your balance just as you grab the iguana, dropping him before you crash to the floor, dragging the Vita-Lite® and heat lamp with you.

If the iguana continues to elude you, dodging between the basking branches, hide box and water bowl, remove as many furnishings as you need to be able to have a clean shot at him. Take away any places he can hide under and behind.

Don't give up. If it is taking longer than you thought it would and you are getting to (or past) the point where you just don't care any more, don't give up! If you do, the iguana will have won that encounter. You will have reinforced the fact that he can indeed make you go away.

If the iguana has gotten out of his enclosure (a polite way of saying that, when you finally got him out, you let him get away from you) and is running around the room or the house, you must get him. It may mean crashing and banging into furniture (you more than the iguana), intruding yourself into that small, dusty place beneath the dresser or behind the bookcase, and rearranging the furniture as you move it all to try to get to him.

Sound tiring and like a big pain in the neck (and back)? You're right - it is. But do it you must.

Once you are finally able to pick him up, hold on to him for at least a couple of minutes. Remember: it must be *your* decision to put him down, not his. If he gets particularly wild, if he scratches, lashes or bites you, do not put him down. If you do, you will have reinforced the concept that scratching, lashing and biting works. It's pure cause and effect, a concept the iguana can easily understand: he hurts you, you put him down.

Yes, you are playing a game of wits and nerves with a little green lizard. It may sound stupid, but it is surprising how many people lose this game.

Holding On and Hanging In

When you are holding your iguana, it will probably be some time before he will quickly settle down and remain more or less still while in hand. For now, when he tries to get away, let him climb from hand to hand and roll freely within your hands. Talk gently to him, frequently saying his name. Gently rock your body back and forth.

If he starts wildly struggling, try the straight-arm overhead hold; he should soon settle down and stop writhing around. After a moment or two of calm, slowly bring him to your eye level. Support his body in both your hands, thumbs under his belly/chest area, his hind legs resting on your forearms, your fingers arched over his back, his face within a few inches of yours. Do be sure to keep the iguana far enough from your face so that he can't reach your nose with his mouth.

Continue talking softly to him, using his name. At this point the iguana should settle down for a few moments. The more often you do this, the less of this preamble to settling down you will have to go through. You will both experience longer periods of calm and can move on to the next stage.

Start making these sessions interesting for the iguana. Walk him into the kitchen for a leafy green or floral snack. Take him on a walking tour of your house, his head facing forward so he can see where you two are going. Walk slowly, talking softly. You will see the iguana start taking an interest in the sights around him, looking at things near the floor, on the wall, turning his head quickly when something captures his attention.

Wait! What was that name thing?

Iguanas learn the sound of their name and, as time goes on, other words that mean something important to them, such as "bath", "poopy", and "car ride". They learn these words because you will be saying them. A lot.

Iguana hearing is well in line with the human speaking voice and iguanas are intelligent lizard. Say their name every time you talk to them while holding them, every time you walk by their enclosure and talk to them, and when you are talking about them. As they begin to recognize their name, they are also learning to recognize your voice. Both will help him become more acclimated to his new situation.

It should be noted that this advice is the exact opposite of the instructions followed by wildlife rehabilitators. They know that talking conversationally around the wild animals they are working with, or talking softly to the animals, or getting the animals used to them, starts acclimating the animals to humans. The last thing you want in an animal who is going to be released back into the wild, especially a "varmint" species who is often subject needless trapping and extermination, is for them to have any trust for humans.

Since this is exactly what we do want our iguanas to have, we name them and talk to them frequently throughout the day.

One Step Forward, Three Steps Back

Expect regression. You may have gone to bed one night ecstatic about the progress you two have made only to find that your iguana's evil twin has moved in overnight.

Just keep doing what you have been doing. Remember that you are bigger and smarter than he is. Really. You are supposed to be. Feel free to frequently remind yourself.

Avoiding A Tragic Tail

Start playing with your iguana's tail when he is young, or soon after you get him. This will get him used to his tail being touched and gently tugged. An iguana who is not freaked when his tail is handled like this is less likely to lose drop it when some untamed little child comes up and yanks on the tail to get your iguana's attention.

Iguanas, like many lizards, have tails that can automatically sever themselves from the rest of the tail or body. This is an excellent escape mechanism when trying to avoid a predator who has gotten too close.[12]

When you go to pick up your iguana, don't grab it by the tail unless the tail is very thick and the iguana knows you very well. Instead, place one hand under the pelvis/base of tail area, then slip your other hand under his chest, and scoop him up. This will help give you some leverage to enable you to pull him out or up out of harm's way.

This pelvic/chest lift is a natural segue to your swinging him easily into a forearm carry. This comfortable position has the iguana's belly resting on your forearm, his legs dangling over each side of your arm. Your fore- and middle fingers cradle his neck, while his tail hangs down between your arm and ribs. You can place your free hand on his back or use it to pet him. The iguana faces forward, so he can see what is going on, and can easily look back at you for reassurance if needed. With very heavy iguanas, you may want to use your free arm to help support the arm that is holding the 15+ pounds of dead weight of your otherwise very much alive iguana.

INTEGRATING IGUANAS INTO YOUR LIFE

Iguanas are alert, curious and interested in their surroundings, eager to explore new spaces and find great places to bask, sleep and, at least initially, hide. One of the fastest ways to tame your iguana, and the best way to ensure a mentally healthy iguana, is to give him as much time out of his enclosure as you can.

Show your iguana around the house again. Show him where his water and food are, and where the basking area is. He may not remember everything the first time out, but iguanas do have good memories for interesting things like basking and hiding areas and will eventually settle on two or three favorite places once given the opportunity to explore and "find" them for themselves. You may wish to keep closed the toilet, closets and boxes you do not want the iguana exploring too closely.

Include your iguana into your daily routine. A plastic hook stuck on the tile wall of your shower with a washcloth securely hanging from it makes a nice place for your hatchling iguana to hang out while you shower. A shoulder or the back of a chair is a comfortable perch while you are eating meals, paying bills, working on the computer, or doing your homework. Hold your iguana and let it sit with you or explore the couch or chair while you talk on the phone or watch TV.

Out Time

Out time requires a bit of preparation. As with a young child, you must iguana-proof the room or rooms the iguana is going to be allowed access to. This means a bit of time on your back and knees, roll of duct tape in hand, covering up holes and openings under and inside cabinets in the bathroom and kitchen, under appliances, and between appliances and cabinets. You must assure that all window and door screens are free of rips and holes and are securely fitted. Remove all toxic houseplants (and non-toxic ones you don't want disappearing into a hungry iguana). And don't forget to check the underside of upholstered furniture to make sure there are no rips in the fabric into which your iguana can secrete himself.

Three pieces of equipment I find indispensable are a large hand mirror, a long stick (I use my 5' hickory walking stick or 6' snake hook), and a powerful flashlight. The mirror enables me to look under and behind things without having to get down on the floor. The flashlight is useful when those under and behind places are dark (which they usually are!). The stick enables me to encourage a reluctant iguana to come out from behind the bookcase or from smack in the middle of the floor under my king-size bed. (Someone also recommended keeping two strong men armed with screwdrivers around to disassemble the furniture, but these larger items are more difficult to store when not in use).

Make sure that the room you are letting the iguana out into is warm enough. It is not necessary to keep the room itself at 92F, but you do need to provide a proper basking area, preferably one 4-6 feet up above the floor where the iguana can look out the window. You can

make an easy climber for the iguana by wrapping a board in sisal rope, carpet remnant or a towel, then securely bracing the board against the shelf of the basking area. Alternatives to the covered board include securely fastened towels, bird ladders, plastic-coated wire shelving section (from home builder supply stores), or several layers of fish netting, or several folds of cloth made with decorative holes, often used for making swimsuit cover-ups.

Introduce your iguana to the basking area so he knows where and what it is. You may also need to "walk" him up and down the climber a time or two so that understands what it is and gets a feel for it. Of course, you may be left wondering why he needs a formal introduction to the climber when he needed no such introduction to immediately size up your expensive lace curtains or Aunt Minnie's fragile antique upholstered settee... As you will come to learn, apparent inconsistencies such as these are just part of sharing your life with a green iguana.

Part- or Full-Time Free Roamers

Expect your iguana to get "lost" in the beginning. As long as he is healthy and nighttime temperatures are within the lower limits of the iguana's required gradient, it will not be the end of the world if he spends the night out of his enclosure.

Iguanas tend to frequent the same places--including hiding places--over and over again. Eventually all you need to do is make the rounds of their favorite spots to make sure they are there and comfortable. Well, safe. I've seen some scrunched up in some pretty funny positions all in the attempt to make themselves invisible.

When you find him, talk to him, making sure using his name, then walk away. This lets him know that you know where he is and that that's okay with you. Eventually, he will realize that trying to hide from you isn't accomplishing what he wants, so he will start spending more time in view, basking, walking around and exploring on his own, rather than squished away somewhere.

Alone Time

Iguanas need alone time, now and then. For caged iguanas, this is difficult to achieve since they are always on view and subject to your comings and goings inside his enclosure.

When the need strikes your free-roaming iguana, he may choose to go to one of his previous hiding places, or may find someplace new that just feels right to him. One iguana of mine favored the second shelf of the towel rack over the toilet in my guest bathroom. Another iguana managed to scale up one of my book cases and squeeze himself on top of the books on the already crowded shelf (of course, being an iguana, he picked one of the shelves containing reptile books). One of my other iguanas headed for the bathtub in my bathroom when he wanted alone time. I learned to be careful when picking up the pillows on my bed after finding them weighted down with iguanas. Some liked to crawl into the pillowcases; others preferred snuggling between two king-size pillows for a nap. Some preferred hanging--literally--onto the sides of the bed, hiding under the comforter.

Many iguana keepers report going crazy looking for their iguanas only to find them contentedly hanging out amongst the items on the shelf above their hanging clothes, or buried at the bottom of a pile of plush animal toys on a bed or play area. A determined iguana can get into some places from which they can't get out, such as into a wastebasket or large decorative pots, so be sure to check inside such places when you can't find them in their usual spots. Also check the sofa, both under the seat cushions and behind the back cushions. Hatchling iguanas can also get into big shoes, such as hiking and other boots, so check those, too.

As long as they are healthy and in good weight, it is okay to leave them in their favored spot until they are ready to resume their daily routine.

If they spend more than one night in an area that is at the low end of their required gradient, move them back to their warm area the following morning, letting them warm up and move into the basking area on their own. Otherwise, a well-fed healthy iguana can withstand a couple of days outside his normal routine. If he wants to spend more time hiding, you will need to figure out what may be stressing him to the degree that he feels more secure in hiding. For more

information, please read the Change-Related Stress and Hypothermia in Iguanas and Other Reptiles articles.

CONCERNED ABOUT CLEANING?

Relatively speaking, this is a non-issue for most iguana owners. They potty their iguanas in their enclosures, or in a large plastic storage container containing water or newspaper (not particulate matter of any type, for reasons discussed in the Substrate section in Part II), or in the bathtub. If accidents happen, they clean the fabric or carpet with a suitable fabric, carpet or upholstery cleaner. Linoleum and tile can be both cleaned and disinfected

Some keepers, especially those with high-risk individuals at home, restrict their iguanas to only one or two rooms, with bathroom access limited to the bathroom not used by the high-risk individual. This reduces the accidental tracking of any organisms from the iguana room to the rest of the house. To further reduce risks, the keeper can take of their shoes outside the iguana room and wear a smock or old shirt over their clothing when handling the iguana and cleaning the iguana's room.

For information on how to properly clean and disinfect, please read the Cleaning and Disinfecting article.

A Note On Health Concerns

Many people are surprised to learn that iguanas, like other animals, can carry organisms that can cause illness in humans. With iguanas, the organism we are most concerned about is *Salmonella*, of which they may carry several different serotypes. *Salmonella* is found in so many healthy animals that it is thought to be a saprophytic organism. That is, it is not beneficial to the host (your iguana), but it causes no harm so long as the population of these organisms remain at or below a certain level.

No matter what the population level is of these organisms, some of them will exit enter the lower regions of the animal's digestive tract, and will be mixed in the feces. If the iguana walks in the feces, the organisms can get onto his toes. Salmonella remains viable (alive and able to cause infection) in dried fecal matter, and on any surface that comes into contact with feces or with the water used to clean Salmonella-tainted surfaces. These may be picked up by humans who don't wash their hands before eating, or by food prepared on surfaces that has been splashed with droplets of contaminated water or objects.

At this time there are no statistics as to how often humans contract *Salmonella* from their iguanas. *Salmonella* common to iguanas and other reptiles differs from the serotypes typically found in our food or other household pets, so it can easily be identified and verified as being from an iguana or other reptile pet. But since many people get only mildly ill rather than seriously so, they write it off as a "24 hour flu" and never go to the doctor, and so the published incident rate of both food-borne and reptile-related salmonellosis are underreported.

Free-roaming in at least one room is highly recommended for the mental and physical health of the iguana. Doing so, however, means that you must be aware that there may be some risk to those family members and visitors who fall into the high-risk category. For more information on *Salmonella* risks and precautions, please read the articles in the Zoonoses page, and the Human Health Concerns article.

And Baby Makes…Four?

Thinking of having a baby in the next 15 years or so? Are you pregnant right now or living with someone who is? Do you run a day-care center in your home? Do you work in the maternity department at the local hospital or clinic? Are you a pediatric physician or nurse? If so, then you should seriously think about *not* getting an iguana unless you are willing to take the steps necessary to reduce the risk of *Salmonella* transmission, something that can be fatal to a human infant.

If you already have an iguana, you do not necessarily have to give it away or relegate it into a back room and never interact with it other than to feed it. Please read the articles at the Cleaning and Disinfecting page as well as those on Salmonella at the Zoonoses page.

Taking It To The Streets

Once your iguana is settling down in your hands, you should begin getting him used to going outside with you. This does not mean you stick your iguana on a bush and walk away. Nor does it mean that you pop a leash around his neck and go walking down the street. It does mean that, as you begin to build up trust with your iguana inside the house, you need to begin building up the same trust outside. When you are inside the house, you do not have to constantly have your hand on the iguana. When you take him outside, however, you need to be in constant contact with the iguana to safeguard against his jumping off and taking off.

I cannot stress enough that iguanas should not be allowed to graze on the grass or forage in a large bush by themselves or even when you are near by. Months, even years, can go by without incident, but it only takes one. I hear from too many iguana owners whose iguanas took off for some reason the owner may or may not have been able to identify. The majority of people either never saw their iguana again, or they found it - dead. Yes, some iguanas are found and returned to their owners, but why risk it?

What you can do is build an outdoor enclosure that is large enough for your iguana (remember: if he isn't full grown now he will be sooner than most people plan for). The enclosure must have a secure latching device on the door to make sure it can't come open accidentally. It is best to actually lock the door to make sure that busy fingers attached to human bodies can't open the door when you aren't around. This not only protects the iguana from predators and annoying, potentially malicious or careless neighborhood kids, but it will also help prevent the iguana from fleeing in a sudden panic--or exuberance--one day.

Within reason, you can use your imagination when it comes to finding an outdoor enclosure suitable for a growing or large iguana. Surprisingly, building one yourself doesn't necessarily require master carpentery skills. Check out the sites and resources on the Iguana Enclosure Plans page for ideas, plans, and resources.

Leashes and Harnesses

I do not recommend the use of harnesses or leashes, especially the so-called "iguana" leashes that are merely ferret and rabbit leashes repackaged with a picture of an iguana on it.

Generally speaking, if a harness/leash is on loose enough so that it does not hurt the iguana, it is loose enough so that the iguana can rapidly dorsally and laterally compress itself and wriggle out. If it is on tight enough so that the iguana cannot get out, then it is too tight and you risk strangling your iguana should he leap off of you or whatever surface he is on. You may also cause the injury or destruction of the dorsal spikes in the area immediately beneath and on either side of the harness.

There are harnesses available that have a sling-like piece that goes under the iguana's chest and through which his forearms are placed. The same problems occur with this harness as with the figure-eight ferret/rabbit harnesses, except that if the harness is loose enough to not injure the spines, it is on loose enough for the sling to slip and a thrashing iguana to break a leg.

If an iguana wearing a harness gets away from you, a tree limb or some other object may snag the leash or harness, trapping the iguana. If he can't be found because of being hidden by the branches and leaves, he will eventually die of starvation, dehydration, hyperthermia, or hypothermia--if a predator doesn't get him first.

If you start getting involved in helping your herp society or other local group by doing public outreach at various educational events, a harness and leash may be a useful device when your iguana is still very small and his dorsal crest is still just little nubs. During these often daylong events, you will most likely want to set the iguana down on the table to give both of you a rest for a little while. If your iguana decides to take off on his own (or is frightened by something), a harness

and leash will give you a couple of extra seconds, depending on your own response time, to grab him before he gets away from the table. (If you do get involved in doing public outreach, you might also want to read The Use of Reptiles in Public Education.)

The Final Frontier

As your iguana is becoming increasingly comfortable with you and calms quickly in your hands, begin to get him accustomed to the presence and touch of other people, and to noise and movement.

Daily noises such as television, music, kids playing outside, cars and trucks on the street, and planes overhead all become part of the daily symphony of life. Unusual noises are eventually assimilated, such as sirens or helicopters hovering overhead, or the assorted yells and exclamations that seem to be required when watching sporting events.

Along with some of your immediate family or household members working with the iguana to become secondary caretakers, many of your guests will be put to work as well, helping with the socialization process. Invite (never force!) your guests to look closely at your iguana, touching him, even handling him if your guest is so inclined (make sure they wash their hands afterwards).

If you take your iguana for rides in the car, he will have to get used to new sounds and sights. Cars whooshing, predatory bridges soaring by overhead, horns honking, the screech of air brakes as big trucks come to a halt, and dogs on the sidewalk and in the back of pickup trucks are just some of the new things your iguana will need to get used to. Do exercise caution when taking iguanas with you in the car. Ideally they should be transported in an enclosure, either seat-belted in or set in the cargo area--but not in the trunk of a car. If you let him out in the car, set up an area for him, just as you would at home. While you won't need all the lighting equipment you have in his basking area at home, he should have a secure place to lay on. If your iguana is not secured in a carrier, it is best to have someone with you who is comfortable handling the iguana who can keep him away from you if you are driving, or let them drive while you control the iguana.

If you start taking your iguana with you when you go out, you will eventually find places that welcome you and your iguana, and places that do not. Respect those that do not. Respect, too, the local health codes and those who own the restaurants and markets you frequent by not taking your iguana inside. Pet stores and nature stores are often great places to introduce your iguana to new people and to do a little educating on your own. So, too, are herp societies and reptile rescues that may welcome your help in educating others about the joys--and trials and tribulations--of proper iguana care and keeping.

IN CONCLUSION...

Take the time to do it right. Be patient. Just as you spent a great deal of money and time setting up the iguana's environment and strive to provide him with the proper care and diet, use the same patience to work with your iguana. It will take anywhere from 6-9 months (or longer, depending upon the individual's temperament) to reach the point where your iguana is comfortable in most situations. That is a short period of time, indeed, when weighed against the potential lifespan of 15+ years.

Most young children (and this includes many kids up into their early teens), do not like being scratched. This is one of the reasons why it is inappropriate for adults to delegate to their children the primary responsibility for the iguana's taming and socializing. Taming iguanas must be a family effort as all members of the family ultimately will be sharing their living space with a strong-willed lizard the size of a medium, albeit low-slung, dog. If any members of the family, especially adult members, are not happy with the idea of an iguana as a pet and are unwilling to help in the care and keeping, then perhaps another type of pet should be considered.

Taming older iguanas is not necessarily more difficult than working with younger iguanas, but some iguanas may never become as fully tame--comfortable and secure in all interactions--as do ones tamed early on. But taming can be done and there is no reason not to start now to retrain yourself and your iguana.

Iguanas have very individualized personalities, each with their own likes and dislikes. Part of the taming and socialization process is to learn what your iguana likes and doesn't like. Respect, as much as possible without compromising the taming and socialization, those needs, likes and dislikes. Though the training and taming time is lengthy and intense, the rewards are great for both you and your iguana.

PART 6: YOU, YOUR IGUANA, AND YOUR REPTILE VETERINARIAN

To be perfectly blunt, do not get an iguana, or any other reptile, if there is no veterinarian trained in reptile medicine, within comfortable driving distance for you. If you do not have immediate access to your own transportation--not public transportation, not a spouse or friends who will drive you when they can fit it into their schedule--do not get an iguana or other reptile.

All new iguanas, whether they are hatchlings you bought from a store or expo, or someone else's pet you've taken in, should be seen by a reptile vet. It can take a long time for iguana owners to recognize signs of illness and disease in their lizards. Iguanas, even long-term captives, are still wild animals and will hide, as long as possible, any signs of weakness. Don't bet on your new iguana's life by skipping the vet visit.

An initial visit, complete with fecal tests and treatment for worms and dehydration should be included as part of the total cost of your iguana. If you can't afford the vet, you can't afford the iguana.

NOT ALL VETERINARIANS ARE REPTILE VETERINARIANS

Human doctors deal with one mammalian species: humans. They deal with essentially four types of humans: males (child, adult) and female (child, adult), but it is still only one species. That's it. They spend years in medical school and doing their residency, go into over $100,000 worth of debt, and what do they get when they get are done? The knowledge to work on one mammalian species.

Veterinarians go through much the same time and training, but instead of one species, they come out being able to treat several mammalian species, from rabbits to racehorses, guinea pigs to goats. The vet schools' curriculum concentrates on farm (work and food) animals, and the most common companion animals (dogs, cats, rabbits). They spend relatively little time, from 1-6 weeks (depending on the school) on "exotics": birds, exotic and local wild mammals legally kept as pets; reptiles and amphibians; fish; and maybe some arachnids. Needless to say, there isn't enough time in a 1-6 week unit to learn everything about the hundreds, if not thousands, of species kept as pets or pack animals. If veterinarian students and graduates want to learn more about certain types of animals, there are various avenues open to them.

The problem reptile owners have is how to find a veterinarian who is trained and experienced in reptile medicine. As too many iguana owners have found the hard way, just because veterinarians includes the word "reptiles" in their signage or phone book listing is no guarantee that they are actually trained and experienced in reptile medicine. By the same token, many vets who are great with reptiles make no mention of it in their signage or listings.

For more information on how to find a reptile veterinarian, please see the articles and resources at the Herp Veterinarians page.[13]

WHY IGUANAS NEED GOOD VETERINARIANS

Pet trade iguanas are always highly stressed, usually dehydrated, have high levels of internal parasites, and sometimes external parasites (reptile mites or ticks). Since they haven't been fed properly, or maintained at proper temperatures, they are also malnourished. When you bring them home, their stress levels increase for several weeks until they start getting used to you and their new home. Getting them treated for dehydration, parasites and any infections will help enable them to better deal with all the new things in their life.

Most people who give away iguanas do so because they haven't, for some time, cared for the iguana properly and don't want to spend or don't have the time or money to do so. These iguanas suffer from all the same things that the pet store iguanas do, often with the addition of abscesses, injuries, and metabolic bone disease.

Remember

The majority of the reptiles and amphibians sold in the pet trade are wild caught. As more people are getting involved in breeding and reselling imported herps--people who usually aren't particularly careful to properly quarantine all newcomers--they animals they sell may be suffering from the effects of stress and transport, as well as communicable and other zoonotic diseases. Farmed iguanas are no exception, given both the filthy, diseased conditions at most "farms" followed by the inhumane way they are transshipped around the world.

When you get a pet, you are taking on the responsibility for caring completely for an animal that, unlike most human children, will never grow up and become self-sufficient. Just as you would take a sick child to the pediatrician or emergency room when the situation demands, so too must you take your reptile to the reptile vet. You will also have to find an after-hours veterinary clinic/veterinary emergency hospital who can appropriately treat, or at least stabilize--reptiles who are suffering from a traumatic injury or illness until you can see your own vet the next business day.

The Initial Physical Exam

The first thing your vet will do will be to check your iguana out from head to tail-tip. The iguana's nutritional status and hydration will also be checked to see if he is dehydrated or too thin. The inside of his mouth, his eyes, the folds of skin along his neck, each of the limbs and toes and the abdominal cavity...all will be felt carefully to check for lumps, bumps, cuts and breaks. The lumps and bumps found could be related to infections, fractures or calcium deficiencies. Be prepared to answer questions about diet, environment, and any possible injuries.

While we're on the subject of questions, be prepared to answer a lot of them. Your vet will want to know where and when you got the iguana, how old he (or she) is purported to be, what you are feeding him (be specific!), how you are housing him, what you are using for heating and lighting, the temperatures and photoperiods. You should also be prepared to describe the iguana's general behavior and any physical problems you have noted:

- loose or discolored feces (possible protozoan or parasite infection)
- favoring or dragging a limb (a possible break, abscess or joint inflammation)
- clicking sounds when breathing or excessive saliva (signs of a respiratory infection)
- jerky gait when moving or tremors when at rest (possible calcium or thiamine deficiency)
- abnormal changes in color (stress, illness)

Iguanas should be alert and move with smooth motions, whether they are speeding across the room or checking out a new object. If your iguana spends most of his time sleeping and is relatively non-responsive, then tell the vet this, too; lethargy is a symptom of several disorders.

Basic Tests

The first test you will have done is a fecal flotation. This test is used to examine the feces for the presence of worm ova. Worms live out their adult life cycle inside the host animal, releasing their eggs to be deposited wherever the animal defecates. Other animals coming into contact with the

feces, may eat or tongue-flick the feces, thus ingesting the eggs (referred to as oral-fecal transmission). This giving the ova a nice place to hatch and set up housekeeping.

The flotation requires a fresh sample of feces--the brown fecal mass, not the clear viscous or white urates. (For more information on this, please read the article, Feces and Urates: The Scoop on the Poop). The vet or vet technician mixes the feces in a special solution in the testing container. A microscope slide is placed on top to trap any ova which, being lighter than the solution, will float to the top. The vet or veterinary technician will then look at the slide under a microscope to determine what, if any, kind of ova there are so that the proper medication can be administered.

Protozoans are another type of organism that can cause illness when present in too high a number. They require a different type of test--and medication--than do the intestinal worms. If your iguana's poop is very smelly and/or reddish and runny, he may have a protozoan infection. Protozoans are not necessarily related to worm problems. Since the feces cannot (hopefully) be smelled through the container that you brought the sample in, you will need to tell the vet about the signs and smell, and ask that he do a smear as well as a flotation. If you see the signs of a protozoan infection after your iguana has been treated for worms, bring another fecal sample to the vet and ask that a direct smear be done.

If your iguana does have both worms and protozoans that need to be treated, ask the vet which one should be treated first. Since giving the two different medications at one time can seriously sicken an already weakened iguana, especially a very young iguana, the best way to treat them is serially, that is, one at a time. The goal is to get a sick iguana feeling better faster so that they can start eating and drinking normally and acclimating to their new environment.

Why Can't I Just Drop Off The Poop?

Veterinarians cannot dispense medication without actually examining the patient. Drug dosages for reptiles are based on actual and metabolic size, and may be different depending on what species of reptile. This means you can't just take a fecal sample from your new iguana to the vet and expect them to run the test and give you medication if your iguana needs it without your bringing in your iguana for an examination.

Don't cancel your vet appointment, however, if you can't get a fecal sample from your iguana on the morning of your first appointment. Go ahead and take your iguana to the vet. When you are talking with the vet, explain that you were not able to get a fresh sample. Ask if you can drop one off, appropriately identified as to the patient's name and species, in the next day or two. When the testing has been done, if the iguana needs to be treated, take the iguana back to the vet with you. If you have never given oral or injectible medication to an iguana before, this is something you want to be taught how to do, not struggle to do it on your own.

Why Can't I Just Treat Him With Medicine From The Pet Store?

The majority of parasitic organisms, and all potentially harmful bacterial, fungal and protozoan organisms, cannot be seen without a microscope. You generally cannot tell whether an iguana has a treatable infestation just by looking at the feces without a microscope. Since different organisms require different medications, and dosing is critical because all drugs are potentially toxic, you can't know which, if any, of the drugs sold over-the-counter are the right type for your iguana.

Most such drugs are not even used by veterinarians any more because they are ineffective. Most people do not have scales that can accurately weigh a lizard and that, without an accurate weight, you cannot accurately calculate the dose. Of course, the instructions on the drug package do not contain enough information to accurately calculate the dose. In other words, doing it yourself isn't the way to save time or money.

For more information on the problems with pet and farm/ranch supply store drugs, please read the Reptile Parasites and Wormers article.

Safely Collecting Fecal Samples

The safest and neatest way to collect a fecal sample is to turn a new zip-lock plastic bag inside out over your hand. With your fingers and thumb protected by the plastic, use them to scoop up the brown fecal mass. While holding the feces in your grasp, use your other hand to pull the zip-lock edge of the bag down and over your hands, turning the bag right side out. Your grasping hand will now be outside the bag and the feces sitting neatly inside. Zip up the bag, and place that bag inside another zip-lock bag. With a marker, write the day's date, the iguana's name, and the species ("green iguana") on the bag.

Store the fecal sample in the refrigerator until you leave for the vet's office. Keeping the sample cool is important, as some organisms will die if they get too hot--or frozen. If you absolutely have to, you can store it overnight in the refrigerator. If you live with anyone, make sure they don't throw the fecal sample out. Also make sure it is out of reach (and, perhaps, sight) of children who may decide it is something to eat or otherwise share with their friends or the family dog.

Follow Through On Treatment!

All too often, pet owners fail to follow through in giving their pets each of the treatments prescribed by their veterinarian. Just as it is critical for humans to take the full course of prescribed antibiotics, so, too, it is critical that you make sure your iguana gets every dose of medication prescribed to knock down or out the worms and protozoans. The same holds true for any antibiotics and antifungals your vet may prescribe when needed.

Some drugs kill organisms. Other drugs interfere with critical processes, such as the organisms' ability to eat or digest food or their ability to reproduce. The drugs don't kill the organism outright but causes them to starve to death or allows them to die a natural death without having successfully produced any offspring.

When only part of the prescribed doses are given, only some of the organisms are killed off or otherwise affected. Those most susceptible to the drug will die. The organisms that aren't killed or immediately affected are resistant to the drug. They can live long enough reproduce, producing offspring who are likely to be even more resistant to the drug.

The failure to follow through on taking all of the antibiotics prescribed contributed greatly to the resistance crisis we are currently dealing with in human medicine. We are now being infected with organisms, such as the "flesh eating bacteria" that are now impervious to any antibiotic we can throw at it. Don't set your iguana or other pets up for the same situation.

One of the two most common reasons people and pet owners give for not taking or giving all of the doses prescribed doses are:

"Well, I was feeling better, so I didn't need it any more".

"Well, my pet was acting like he felt better, so I stopped giving him the medicine."

The human and pet were both feeling better because the medication had been knocking out the most susceptible organisms. When the patient "relapses" later, it usually isn't a relapse. What has really happened is all of those resistant organisms that survived because the drug was stopped too soon have been happily reproducing and producing generations of resistant bugs. Better to take the full dose prescribed the first time rather than make yourself--or your pet--sicker or more difficult to treat later.

When The Treatment Is Worse Than The Infection

The second most common reason for stopping a drug before the prescribed number of doses have been given is that the patient felt or acted significantly sicker after the first several days (or after the first dose for drugs given at wider intervals).

Generally speaking, feeling worse a good thing. The patient is sicker because the drug is doing its job: it is killing or otherwise causing the death of the organisms. As the dead organisms

lie around decomposing, they release byproducts of decomposition which, when you think about it, is enough to make anyone sick. If the organisms live in the gut, the dead organisms may hang around for a while as they are slowly shoved along the digestive tract by passing ingesta and, later, wastes.

This feeling worse before feeling better actually has a name: Herxheimer, or *herx*, named after the doctor who first described it. *Herxing* is a commonly experienced reaction in people who are on antibiotic and antifungal treatment (such as for *Candida* and Lyme Disease), and is often seen in very young animals who are treated with wormers and other drugs.

There is one drug in particular that often causes extremely bad reactions in very small iguanas, and in young iguanas who are already in a weakened state. Ivermectin, sold under the brand name Ivomec, is an injectable wormer. Despite the fact that it has to be given in much higher, near toxic doses than other, less toxic (to the patient) wormers, I don't understand why so many reptile vets still use it. If your vet says your iguana needs worming, ask what medication he plans to administer. If he is planning on giving ivermectin, ask that fenbendazole (for pentastomids) or piperacine citrate (pinworms) be administered instead.

Annual Vet Visits

We tend to think of annual vet visits in terms of dogs and cats who go in for their annual vaccinations. There is another reason for an annual visit: sometimes problems arise that set in so slowly that the pet owner doesn't notice them. The veterinarian, who hasn't seen the pet for a year, is able to spot some of those problems and address them before they become major health problems.

To better enable the vet to spot problems, have a reptile blood panel done every year. Having blood work done when the iguana is healthy provides baseline information against which changes can be compared and assessed.

Iguanas are a lot like humans. There are "norms"--ranges considered normal for healthy members of a species or group--for all the different blood constituents (cells, enzymes, etc.). Laboratories that do mostly cat and dog pathology may miss things in blood and tissue collected from reptiles, so your vet may have to send blood and tissue specimens out a lab with more experience in reptile pathology. These labs help produce the data on norms, as do many reptile veterinarians.

Having the same tests done annually when your iguana is healthy will establish what the norms are for your iguana. Your vet will use that information, along with the lab's species's norms and data published in other sources, to assess your iguana.

Confounding Variables

There are a couple of tests whose results may indicate a health problem but, in an otherwise healthy iguana with otherwise normal test results, are nothing for you (or your vet) to worry about. One or more of the following can cause these abnormal test results:

- the stress of the trip to the vet, or being at the vet's office;
- stress due to the restraint and needle sticking required to get a blood sample for testing;
- collecting or forcing the blood through too small a needle, causing hemolysis (breaking the cell walls).

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The white blood cell (WBC) count can be temporarily elevated as a result of the stress of the visit or blood collection. The white blood cells are part of the immune system's infection-fighting force and so are typically elevated when the body is fighting an infection. It can also become very elevated due to certain blood disorders. When a vet sees a moderate elevation, the first thought is of infection.

Stress can also cause the elevation of creatine phosphokinase (CPK). This enzyme is found in the skeletal, smooth, and cardiac muscles. Its elevation in a sick iguana should set alarm bells ringing. In a healthy iguana and in the absence of any other signs of illness (except, perhaps, a mildly elevated WBC), a slight to moderate elevation in the CPK is nothing to be concerned about.

More information on lab tests can be found on the Health page.

Emergency Veterinary Care

Any condition that would cause you to get a human being to the emergency room as fast as possible should trigger the same response in you when those conditions are happening to your iguana or any other pet. The following conditions might sound like obvious reasons to get the iguana into the vet ER right away, but based on email, posts and phone calls from people who ask what they should do in these situations, I decided it apparently needed to be stressed for some people. The emergency condtiions include but are not necessarily limited to:

- Bites from any type of animal
- Bleeding that cannot be stopped within a few minutes of the injury
- Broken limbs (both when the bones poke through the skin, as well as when there is a unilateral swelling and favoring of one limb)
- Bulging eyes (may be accompanied by drooping lower eye lids)
- Deeply sunken eyes
- Extreme lethargy (not related to improper temperatures or hypothermia)
- Hemipenal or cloacal prolapse
- Paralysis, full or partial
- Seizures
- Swollen neck and/or dewlap

Because emergencies often occur outside of your reptile vet's regular office hours, you should know, long before you ever need one, the name, phone number, and actual location of the emergency veterinary hospitals in your area that can treat reptile patients. Not all such hospitals want to deal with reptiles because the staff and vets don't like them or have enough experience to even feel comfortable making a tentative diagnosis and stabilizing the animal until the client can get to their regular vet. The time to find out that the emergency hospital closest to you doesn't "do" reptiles is not when your iguana is bleeding uncontrollably or is lethargic and apparently has stopped breathing.

A Note On Blood and Bleeding

It is estimated that blood accounts for between 5-8 percent of a reptile's body weight. Reptiles can generally loose up to 10 percent of their blood volume before going into shock.

Most iguanas, even healthy ones, have some degree of chronic dehydration. This means that a healthy captive iguana has somewhat less blood volume by weight than a similarly sized wild iguana. If you can't get the bleeding stopped within a very short time, get to the vet right away. There is no way to state how much time the iguana has before going into shock as the

length of time is going to vary based on the size of the iguana, his pre-injury physical condition, and what his starting blood volume was before the bleeding started.

Non-Emergent Veterinary Care

There are conditions for which you need to get to the vet much sooner than waiting for your iguana's annual appointment, but for which you don't need to go racing out of your house in your pajamas at midnight on Saturday night. You do need to call your vet's office on the next business day and make an appointment to get in to see the vet within the next day or so.

- Abnormally snappy or irritated behavior
- Abscesses (dry or oozing lumps anywhere on the body, limbs, digits, tail, head/neck)
- Bilateral swelling of lower jaw and/or hind legs
- Bumps/Lumps along spine and tail
- Constipation (not resolved by correcting temperatures and a bath with massage)
- Favoring any limb or body part with no signs of swelling
- Females entering breeding season (get that serum calcium checked!)
- Oozing or crusty lesions or lumps
- Runny or discolored feces not related to a particular fruit or vegetable in the previous day's food
- Small black patches larger than one scale in size
- Smelly feces
- Swollen joints
- Tail that is swollen, mushy and/or oozing, or drying out and collapsing in on itself
- Twitches and tremors, serial and intermittent (not the occasional benign single myclonic twitch or jerk)
- Urates thickened, yellowish, reddish or orange in color (not associated with breeding season)

There is a wide range of microorganisms that can cause a wide range of signs and symptoms. Until you have several years to learn what is normal for iguanas and what is not, take your iguana to your vet.

If you post these signs and symptoms on Internet message boards or email lists, the experienced people probably can give you a good idea of what the diagnosis is. They will, however, always add that you need to get your iguana to the vet for a proper diagnosis and treatment.

Don't try to treat any of these or other conditions at home, on your own or with information you are unable to adequately assess. Iguanas, like most other essentially wild animals, hide pain and illness as long as they can. By the time most humans realize something might be wrong, things are usually very wrong.

If there is any doubt, any question, any concern, don't wait: investigate!

RECAP: IMPORTANT IGUANA AND HUMAN HEALTH CONCERNS

There is a large collection of articles dealing with iguana health problems linked to Iguana Health, with more information on reptile disease found at the Herp Health page. Please familiarize yourself with the herp articles, and plan to spend some time reading the articles on the Iguana Care page to familiarize yourself with all the things that can go wrong.

For more information on human/reptile health issues, please read the article on Human Health Concerns.

Mites and Ticks

Ten years ago, the incidence of mites on an iguana was almost unheard of. Now, mite- and tick-infested iguanas are all too common.

If you do have mites, please read the article on Reptile Mites to find out how to go about treating your iguana and its enclosure, and the pros and cons of some of the commonly recommended products. Pet store mite remedies do not work and pesticides must be used with extreme caution.

If your iguana has patches of scabs from a heavy mite infestation, take him to the reptile vet to be checked out. Heavy and prolonged mite infestations can cause anemia and stress-related systemic infections.

Ticks have been steadily increasing in stores that buy wild-caught reptiles. If you do not know how to properly remove ticks, don't try it at home. If you remove them improperly, you could leave the tick's mouthparts embedded in the iguana where it can fester and cause an infection. If you get the tick's blood or salivary secretions on you or you don't dispose of the tick correctly, you could infect yourself or others by passing along one of the numerous microorganisms that live inside ticks that are the cause of tickborne diseases. Not only is there no cure for most tickborne diseases, we don't even have tests that can accurately find most of them in humans, let alone in our pets.

Take your tick-infested iguana to the vet, and keep him away from other animals in the waiting room until you are shown into the examination room.

Salmonella

Several years ago, there were only scattered reports of *Salmonella*-infected people who picked up the *Salmonella* organism from their iguana. Due to the increasing numbers and correspondingly worsening conditions in which the pet trade maintains these lizards, the frequency of *Salmonella* has risen dramatically. National attention was focused on this problem when an infant died because her parents unwittingly caused her to be infected with their iguana's *Salmonella*. This news story highlighted both the ignorance of most pet owners about zoonotic diseases and the fact that, even with the bad press, the pet stores made no changes to their care practices.

Salmonella is of especial concern to pregnant women, newborn babies, infants and toddlers, the elderly, and anyone with a compromised immune system, cancer patients, and those with HIV/AIDS.

Strict disinfection must be done, and contact with new animals limited to persons not vulnerable to infection until such time as the new iguana has stabilized and is healthy (a healthy reptile can still have *Salmonella* but may be less likely to excessive numbers of the organism).

Since iguanas (or other pets) who have *Salmonella* may not shed the organisms every time they defecate, a fecal exam to test for *Salmonella* may give false negatives. Talk to your vet about doing blood tests for *Salmonella* detection.

If your iguana is otherwise healthy but tests positive for *Salmonella*, knowledgeable vets and the Centers for Disease Control and Prevention recommend that they *not* be treated with drugs to try to eradicate or reduce the level of *Salmonella*. Treating iguanas that are not actually sick from the *Salmonella* will lead to antibiotic-resistant strains of *Salmonella*. That will increase

the health risk to humans as the same or similar antibiotics are used in humans as are used an iguanas. Further information on how to protect yourself and your family can be found in Precautions You Can Take To Prevent Contamination.

PART 7: SUMMARY OF KEY POINTS

Iguanas are not easy-to-care-for lizards.

Iguanas get to be 5-6 feet within 4-5 years.

Iguanas are herbivores, not omnivores. Animal protein is NOT a required food item and should be avoided completely.

Iguanas are not suitable pets for children.

Iguanas have a mouthful of very sharp teeth and are not afraid to use them when suitably motivated.

Iguanas take a lot of time, effort, patience, and money! Along with that $9.95-20 you will pay for the iguana, be prepared to spend an additional $300-400 or so for the following *necessary* equipment, supplies and services:

- Minimum 55 - 60 gallon tank (for hatchlings: they will outgrow this tank within the year which gives you a chance to plan and build his adult-sized enclosure, which will cost you another $200-500 or more, depending on size, materials, carpentry, etc.)
- Heating pad
- Substrate (suggested to start: paper towel or terry cloth towels)
- Hide box straddling the middle of the tank, or one at each end
- Branch or box to get closer to the basking light/higher temperatures
- Daytime basking light and light fixture
- Nighttime heat light or ceramic heating element (CHE) and light fixture
- Thermometers (minimum two, three is better; best is an electronic temperature sensing device)
- UVB-producing fluorescent tube and light fixture
- Timers (one for each of the three types of lights unless you can control the daytime lights with one timer)
- Dimmer switch (for daytime heat light; may need a second one for the nighttime radiant heat source)
- Water bowl
- Food dish

- Multivitamin supplement
- Calcium supplement
- Thiamine supplement (if food will be primarily frozen than fresh)
- Cleaning and Disinfecting Supplies: Spray bottles; disinfectant; sponges; bucket, tub or pail; vinyl or latex gloves; scrub brush; putty knife; ammonia-free glass cleaner; lots of paper towels
- Claw clippers
- Blood clotting aid for claws
- Povidone-iodine
- Triple-antibiotic ointment
- Reptile veterinarian
- Healthy iguana (see Picking A Healthy Iguana [15])

Getting Connected

While this article is more extensive than most books on basic care, feeding, and taming, this article just touches the surface of what it takes to care for an iguana properly. It does not address the numerous health and behavior information that all iguana owners need to become familiar with so that they can prevent problems and be prepared for maturational changes. If this ICFS article is the only iguana-related article you have read at my site, grab another soda or reheat your cup of tea, and settle down for some more reading! Explore both the articles linked to my Iguana Care Collection page, as well as the articles in the rest of my Herp site.

Keeping, or being kept by, a green iguana is still considered to be odd or abnormal. You will probably find, as have many iguana keepers before you, that having other iguana people to talk to can be very helpful. Rather like new mothers flocking together to compare notes on their human babies, iguana "parents" can be helped, encouraged--and soothed--by talking with other iguana parents. Some resources to explore include:

- Your local herp society
- The Iguanas Mailing List http://groups.yahoo.com/group/iguanamail
- The Green Iguana Society Forum & Chats www.greenigsociety.org
- Kingsnake.com's Iguana Forum and Chats www.kingsnake.com > Forums & Chats

Iguanas can be wonderful to live with. Just like us, they have their good days and bad, good points and bad. Even when you have your daily routine down pat and your iguana is full grown, healthy and well adjusted, there will still be problems that arise. The classified ads, postings on Internet forums and email lists, and the constant intake of iguanas at reptile rescues and animal shelters clearly illustrate that people are getting iguanas who should not be. If you in any way feel that you are not up to putting in the time, devoting the space and financial resources on an ongoing basis, or not willing to take the necessary health precautions, or accept the risk of a potentially serious injury, please don't get an iguana.

In the end, we will conserve only what we love,

We will love only what we understand,

We will understand only what we are taught.

Baba Dioum

Part 8: Footnotes, Article and Website References

For those reading the PDF version of this article, you will find an HTML page with active links for the following articles and sites at the main ICFS page at my site (www.anapsid.org/iguana/icfs)

1. Wild-caught vs. farmed iguanas. www.anapsid.org/iguana/farmed.html
2. CITES www.cites.org
3. *Cyclura* Species Status: http://php.indiana.edu/%7Eemartins/Melissa/blair2.html
4. Iguana Classification: www.anapsid.org/iguana/genus.html
5. Animal protein issues: www.anapsid.org/adambritton.html; www.anapsid.org/iguana/whatdid.html
6. Sleep: More than just rest: www.anapsid.org/sleep.html
7. Susan Donoghue VMD, www.herpnutrition.com/greeniguanas.htm
8. Vitamins for Chronic Disease Prevention in Adults. *JAMA. 2002;287:3116-3126*
9. Iguana Teeth www.anapsid.org/iguana/teeth.html
10. Lizard Tough Guys www.anapsid.org/alberts.html
11. Size Does Matter www.anapsid.org/iguana/sizematters.html
12. Tail, Limb and Digit Autotomy: www.anapsid.org/autotomy.html
13. Herp Veterinarians: www.anapsid.org/vets/
14. Salad Size: www.anapsid.org/iguana/saladsize.html
15. Picking A Healthy Iguana: www.anapsid.org/iguana/pickingigs.html

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Adam Britton's Animal Protein Issue: www.anapsid.org/adambritton.html

Alfalfa (Mature): www.anapsid.org/iguana/alfamat.html

Breeding Season Basics: www.anapsid.org/iguana/breedingbasics.html

Cage Materials: www.anapsid.org/resources/cagematerials.html

Calculating the Cost of Electricity: www.anapsid.org/electricitycost.html

Change-Related Stress: www.anapsid.org/iguana/changestress.html

Circadian Rhythm in Reptiles: www.anapsid.org/parietal2.html
Claw Trimming: www.anapsid.org/clawtrim.html
Cleaning and Disinfecting (article): www.anapsid.org/cleaning.html
Cleaning and Disinfecting (page): www.anapsid.org/maincleaning.html
Commercial Reptile Food Development: www.anapsid.org/comfood.html
Determining Iguana Age and Size: www.anapsid.org/iguana/agesize.html
Emaciation (Starvation) Protocol: www.anapsid.org/emaciation.html
Evaluating Commerical Diets: www.anapsid.org/evalcomm.html
Fact vs. Fiction: Clarifying and Verifying the Literature: www.anapsid.org/factfict.html
Feces and Urates: The Scoop on the Poop: www.anapsid.org/iguana/feces.html
Fire Safety Information Resources: www.anapsid.org/firesafe.html
Human Health Concerns: www.anapsid.org/humheal.html
Hypothermia in Iguanas and Other Reptiles: www.anapsid.org/iguana/hypothermia.html
Iguana Behavior Articles: www.anapsid.org/iguana/index.html# behavior
Iguana Bibliography: www.anapsid.org/iguana/igbiblio.html
Iguana Enclosure Plans: www.anapsid.org/iguana/caging.html
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Iguanas: Survival of the Tastiest: www.anapsid.org/downer.html
John Iverson's Adaptations to Herbivory in Iguanine Lizards: www.anapsid.org/iverson.html
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Male Iguanas In Breeding Season and Human Females: www.anapsid.org/iguana/season.html
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Mercury Vapor: www.anapsid.org/mercuryvapor.html
MK Salad: An Illustrated Reference: www.anapsid.org/iguana/mksalad.html
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www.anapsid.org/iguana/vacationstress.html
Musings on UV and D3: www.anapsid.org/uvd3.html
Picky Eaters: www.anapsid.org/iguana/pickyeaters.html
Plants: www.anapsid.org/mainplants.html
Preparing for Egging & Incubation: www.anapsid.org/iguana/egging.html
Reptile Lighting: www.anapsid.org/uvtable.html
Reptile Parasites and Wormers: www.anapsid.org/parasites1.html
Reptile Skin Shedding: www.anapsid.org/shedding.html
Seminal Plugs and Exudates: www.anapsid.org/seminalplugs.html
Sneezing: www.anapsid.org/sneeze.html
Substrates for Reptiles: Caveat Emptor: www.anapsid.org/substrates.html
Swimming: Not Just A Bathroom Activity: www.anapsid.org/iguana/swimming.html

The Use of Reptiles in Public Education: www.anapsid.org/repsineduc.html

To Fu or Not To Fu: www.anapsid.org/aboutmk/tofu.html

Vitamin Supplementation: www.anapsid.org/vitamin.html

Zoonoses: www.anapsid.org/mainzoonoses.html

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C. Richard Tracy, PhD www.unr.edu/biology/tracy.htm

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Fundacion Pro Iguana Verde (Green Iguana Foundation) www.cocori.com/library/eco/igprk.htm

Hand/Arm Protection
Ig Gear www.iggear.com
Lizards in Kevlar lizards-in-scarves.blogspot.com/2005/12/lizards-in-kevlar.html

International Year Book published by the Zoological Society of London www.zsl.org

John B. Iverson PhD http://www.earlham.edu/~johni

Rain Bird Irrigation Systems http://www.rainbird.com

Supplementinfo.org www.supplementinfo.org

Trader Joe's www.traderjoes.com

Thyroid-Info.com www.thyroid-info.com

United States Fish & Wildlife Service www.fws.gov

RockSolidHerps.com (Formerly: Quantum Nutrition, developed by Susan Donoghue VMD)
www.rocksolidherps.com > Nutritional Support Products > Lizards

Ultraviolet Light/Sun Exposure Sites:
EPA SunWise UV Index: www.epa.gov/sunwise/uvindex.html
MedlinePLUS Sun Exposure: www.nlm.nih.gov/medlineplus/sunexposure.html
Local Weather & UV from Weather Underground: www.wunderground.com

William B. Hayes PhD www.llu.edu/llu/grad/natsci/hayes/hayes.html

World Wildlife Fund / TRAFFIC USA www.panda.org