Anegada Iguana Headstarting Facility Husbandry and Maintenance Manual

- *Cyclura pinguis*

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Table of Contents

PREFACE

This manual documents the basic instructions for care of the *Cyclura pinguis* at the headstart facility on the island of Anegada, British Virgin Islands. This document, while referencing some generalized iguana information, has been specifically tailored to address the particular needs of *C.pinguis* located on Anegada. The information contained herein is structured for use by the keepers on Anegada in order to properly maintain a high level of care required for nurturing healthy *C.pinguis* with the limited local resources.

Acknowledgement:

A special thanks is given to Dr. Juliann Sweet who was the primary contributor and creator of this manual. Her continued support for the *C. pinguis* and the ISG has been graciously given of her own accord. She continues to give her time and expertise without hesitation to further this project so that positive results can be achieved. She also has generously funded supplies and food that have been directly forwarded to headstart facility. She continues to be forthcoming with advice and ideas for improvement of the facility, training ideas for the staff, and solutions to problems faced by the *C.pinguis* in the wild.

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INTRODUCTION

The Anegada Husbandry and Maintenance Manual was created for the keepers of the headstart facility on the island of Anegada, British Virgin Islands. It has been created as a comprehensive guide to assist and further aid in the knowledge of care-taking activities as *C.pinguis* keepers. This manual is broken into six sections. Each section begins with a general overview of area of focus so that the reader understands the "big picture." It is then further detailed with step by step procedures and check lists to aid the keeper on a daily basis. The sections are Nutrition and Diet, Evaluation by Keepers, Hygiene, First Aid and Emergency Care, Handling Techniques, and Deceased Animal Processing. -- *Sandra Binns, Editor*--

NUTRITIONAL OVERVIEW

Feeding and meeting nutritional needs of *Cyclura* has been an ongoing, evolving process progressing at a slow pace due to a void in scientific research on the specific needs of these animals. Most diets are developed from captive management and have been modified with improvements as these animals remain in captivity over the years. Therefore, this does not represent the entire scope of particular species needs but attempts to aid in the overall growth and development by establishing a nutritionally sound base. The contents within this section are the opinions of the author based upon numerous years of experience and research.

Some dietary programs are formatted on what an iguana eats in the wild; this approach is flawed as there is only a limited knowledge of what precisely, and in what quantity, free roaming iguanas eat, specifically, *C.pinguis*. Diets vary with seasonal conditions and iguanas are opportunistic in their eating habits; therefore, consumption will include a variety in vegetative material and soil/mineral. Quantitative analysis will be difficult to confirm within even a 75% accuracy of specific needs because items in trace amounts can have significant impact on nutrition. Disease and malnutrition caused by limited seasonal supply of nutrient rich foods may shorten the life span of today's *Cyclura* population significantly.

Husbandry and nutrition are critical to the program's final goal of overall good health and to the release of its captives. Without sound husbandry procedures, a genetic candidate for release will not maintain its health. A nutritionally sound program combined with a well thought out and employed health care management program should ensure the longevity of a juvenile both at the facility and in the wild after its release.

The formulation of a complete and properly balanced diet is complex due to the large number of nutrient interactions, the differing bioavailabilities of nutrients from ingredients and the difficulty in procuring and administering "micronutrients" to the diet.
Thus, a properly balanced program reflects a combination of perhaps over 40 nutrients and their components.

Vitamins, minerals, water and amino acids pose a complex inter-reaction and relationship. Water is essential to cooling, digestion and absorption among other functions. While most animals can receive the majority of water requirement from food sources in the wild, the processed foods in captivity will require additional water offered to assist in proper digestion and absorption.

Plant toxins contained in items such as raw potatoes or nutrient antagonists such as broccoli can induce nutritional stasis or worse. Corn and corn meal (commonly a main ingredient in commercial diets such as the Zeigler Iguana food previously fed at the facility) can have a broad range of effects on the system from toxic to chronic.

Review for Nutritional Requirements

The growth stage is the period when most nutrients are required in their highest level. The juvenile *cyclura* in a headstart environment certainly fall in this range of study. It is also necessary to obtain a good starting point for nutritional evaluation from a known species such as *I. iguana*. With evaluation and monitoring of this species (*I. Iguana*) over the years as well as the species specific (*C. pinguis*), we can optimize nutrient levels and compensate for specific or unique requirements. Some anecdotal work has produced evidence that rapid growth in the juvenile stages, (defined rapid as healthy) fed protein at levels of 15-20%; levels of 10% or lower grew considerably slower with stunting observed. The animals fed protein at 5% or below were severely stunted and the mortality rate was high. The animals in the upper range of perhaps 30-35% experienced rapid growth for a period then growth depression and further metabolic deterioration.

Other factors impacting the success of a nutritional program include stress and disease. Stress is both physical and psychological and captives are subjected to high levels daily. Stress factors for these iguanas would be the caretakers, crowding, handling, exposure to bacteria at higher levels than in wild and of course, malnutrition. When the stress is cumulative, the iguana can become ill, decrease in weight gain or further in weight loss. This diet should provide an abundant store of nutrition for growth, health and replacement of stress induced depletion.

For a diseased or debilitated animal, the most important nutritional component is water; second maintain the energy intake via fats, proteins, complex carbohydrates; thirdly, protein for tissue repair and immune responses activated in times of stress or illness.

While there is lack of valid research for these iguanas, certain vitamins increased for juvenile *C. pinguis* would be prudent. Vitamins such as C (repair liver damage and to improve overall health); D (liver and kidney disease may impair the production of D3); K (increases normal intestinal flora reduced by captive stress); B complex (anorexia and depletion of protein /energy corrected by this addition); Zinc (maintains immune system and healing).

The addition of the Critical Care Diet to the daily mix would supply these trace mineral and necessary vitamins in sufficient quantity to add to an animal's daily body store. See Appendix A and B for a list of common produce/food.

Observational Signs of Malnutrition and Illness

- low body weight and/or poor growth caused by inadequate intake of food, insufficient quantity of food offered, inappropriate diet, infrequent feedings, maldigestion or malassimilation of foods
- diarrhea and/or malabsorption evidence of abnormal feces (color and consistency and quantity)
- skin, muscular or skeletal changes evidenced by abnormal swelling, lesions or postures
- behavioral changes (activity and appearance) evidenced by listlessness, respiratory problems, restlessness or aggression

  Interpretation of feces is a rapid and available tool for the keeper. Knowing what constitutes a normal fecal appearance can provide the basis for an early warning.

Diarrhea is a symptom of disease; the causes of diarrhea are many; the most common are listed:

- Diet –spoiled food, new foods contaminated water, poor nutrition
- Intestinal infection—bacteria, fungal, parasites, viral
- Disease affecting intestines—liver, kidney , pancreas
- Foreign body ingestion
- Stress

Constipation causes:

- Intestinal obstruction
- Impaction
- Dehydration
- Tumor or abscess
- Retained egg

Common causes of other abnormal feces and urine:
Feces:

- Blood(bright red) indicates bleeding in large intestine, severe infection, poisoning, excessive stress
- Mucus indicates intestinal infection, inadequate digestion
- Passing whole foods indicates poor digestion, spastic intestines, lack of digestive enzymes or hindgut motility

Urine

- Excessive liquid indicates stress, kidney, pancreas or liver disease
- Blood indicates kidney infection, stress or poison
- Yellow or green indicates liver disease and can be a factor of malnutrition

NUTRITION AND DIET FOR CYCLURA

The facility should maintain records and be consistent in the amount and type of fresh food offered to the juveniles. The commercial diet now in use is the Zoomed Natural Iguana Diet for juveniles. The dietary ingredients are listed in Appendix H as is the Critical Care by Oxbow. The difficulty in assessing any diet has been detailed earlier in this guide; the current method of measure and balance is by 5-gallon buckets into which the chopped food, commercial diet and Critical Care are added.

The dietary mix would be prepared as follows:

- Chopped fresh grown and gathered foliage at 75%
- Zoomed pellets at 20%
- Fresh produce(fruits and vegetables 5%
- Fresh water (approximately 2 cups)

- Twice weekly a calcium supplement should be added (mix 3 tablespoons of calcium per 5 gallon food bucket)

The original mix of Calalu and ***Portulaca** oleracea were not adequate to maintain optimum growth in the captive animals. After review of reports by Carey, Gerber and Mitchell along with information submitted by Hudson and Alberts, an island search located most of the foliage *C.pinguis* have been observed to graze. Several of these were seasonal and several were rich in nutrients when all of the plant was consumed. More focus was given to vegetation noted in the earlier studies as the posit was several decades of overgrazing and erosion would force current wild iguanas to ingest items less nutritionally

sound. The goal for this facility is to provide the most sound and effective nutrition to its captives.

Until such time as a constant supply of the preferred foliage is available, the Calalu grown and harvested for use at about 50% of foliage or 2.5 gallons. The other 25% should be of the preferred gathered or newly planted items such as cacti, maidenberry, cowberry, gooseberry, sea grape to name a few. Several of the native plants provide not only leaves for consumption but fruits/berries and flowers all contain higher sources of vitamin C and B. *These items must be noted on the daily activity sheets completed by the keepers.* See Appendix A for the list of native plants

Additional water of approximately 2 cups is added to the mix along with the commercial food and fresh produce. *The produce items and their quantities must be listed on activity sheets*. Produce such as seasonal vegetables and fruits are used for variety to encourage sampling new food items (as iguanas do foraging in the wild); secondly, the produce adds moisture naturally to the diet for captive juveniles. It is understood with the new diet composition, fresh fruits and vegetables are at times an expensive luxury to the facility. The allocated volume of 5% will not create a nutritional imbalance of significance if more fruits are added some days and more vegetables other days.

Twice weekly a calcium supplement should be added to mix; 3 tablespoons per 5-gallon bucket would be the maximum.

This mixture was fed to 52 juveniles from the 1997-2000 collection. The keepers were advised that the juveniles should be fed unlimited quantity; thus *the 5-gallon bucket should be considered a form of measurement and not the total amount fed.*

Food for the iguanas under two years old must be finely chopped and mixed; unfortunately, this will encourage drying out of the food at a more rapid pace. The recommendation is to mist the food often during the day; this would assist in the re-hydration of the juveniles as well as their food itself.

Drinking water and cage maintenance has been detailed earlier; their importance to the success of the project and the health of its captives cannot be understated.

*A notation must be made that while gathering and supplying the *Cyclura* with native foliage, harmful plants (plant toxins) must be considered in this captive environment. The injury caused to stressed animals or animals not allowed to forage and ingest large amounts of detoxifiers can be quite severe: illness or death when ingested, cell changes resulting in heritable mutation, neoplasia or irritation to skin and mucosa. While further discussion is impractical in this guide, there is one footnote in my research I found important to this facility's dietary program-- oxalic acid is the only organic acid toxic to animals. Oxalates, common in plants rarely reaches toxic levels, except in Oxalis, Rheum, Rumex and ***Portulaca sp.*** I question the wisdom of cultivating and adding **Portulaca** to the *C. pinguis* diet; this may be a factor in the delayed growth and could perhaps lead to survival problems after release.

EVALUATION BY KEEPERS

The considerations for the care of the animals come with a thorough evaluation of daily routine care and the animals. Frequent examinations of all iguanas in the facility will detect problems, aid in the collection of valuable data for the species as a whole as well as the individual and establish a consistent, accurate identification. The axiom that efficacy of husbandry practices and the plane of nutrition can be determined by assessing the physical condition is critical in identifying and understanding problems as they occur in the captive environment prior to release for these juveniles.

Review list for husbandry:

- Dietary program considered balanced, consumed and correct for species, stage of growth
- Cage Design adequate for purpose of growth and development
- Hide boxes and basking areas clean, secured and relatively pest free
- Animals sheltered from extremes of the environment
- Cage disruption and stress at a minimum

Keepers' Responsibility

Food and Water

- Every morning and evening review each cage prior to unlocking, entering and exiting.

- Prepare morning feeding of greens, fruits, vegetables, pellets, etc.-using 5-gallon bucket. Fill the bucket 3/4 of the way with cut greens from the garden or list of plants on Appendix A and B. Add in Zoomed pellets to add another 20% of volume, then top with 5% fruit and vegetables. Thoroughly mix the cut greens, pellets, fruits and vegetables add in water as necessary (up to 2 cups). Twice a week add calcium supplement to this food mixture.

- Fill (in abundance) a minimum of: 2 food bowls for each of the smaller cages (1A, 1B, 2A, 2B, 3A and 3B); 4 food bowls in the larger cages (4,5,6 and 7). Number of food bowls in the hospital cage (8) will vary based upon number of occupants.

- Clean and fill at least one water bowl per cage.

- Enter each cage, count and review the occupants and overall appearance. Clean basking areas and ground surfaces of any lizard waste. Cleaning off the hide boxes and basking areas can either be accomplished with a hand brush or in some cases stubborn areas will necessitate the use of a scrub brush. Using diluted Nolvasan (chlorhexidine) will also aid in disinfecting; remember to rinse thoroughly. The ground surface should also be cleaned of any waste, using either the hand brush or rake.

- Place food bowls in less than obvious places (an attempt to simulate foraging activities) and change these locations daily. Water bowls can be placed in more obvious sites daily.

- Throughout the day the keeper will want to check the food in the bowls, if it empties, the keeper should refill the bowl. If the foliage appears to be drying out, the keeper should moisten the food with water (using a spray bottle).

- At the end of the day, every food bowl and water bowl must be removed and cleaned. All excess food should be thrown away and the bowl should be scrubbed clean. The water bowls should all be emptied and scrubbed clean as well. It is imperative that this task be completed daily to inhibit the emergence and spread of bacteria. Using diluted Nolvasan (chlorhexidine) will also aid in disinfecting; remember to rinse thoroughly.

An alternative to food bowls is to use paper plates which can be discarded after each use.

- Equally important is to pick up the food debris and lizard waste that is on the ground and on any basking areas. This exercise is quickly and easily accomplished by using a small hand brush on the basking areas and using a rake on the ground substrate.

Cage Design

- Although a fair amount of time was initially spent on setting up a cohesive and lizard friendly cage design, it may not be suitable long term as the iguanas grow and settle into their routines. It will be obvious to the keeper as he watches the animals and their behavior over a few days. For example: if all of the animals seem to congregate on one side of the cage and are all fighting for limited amount of basking tree or hide tube, then the keeper, recognizing this, should either add more tubes or move some tubes from a wall that is not being used over to the crowded areas.

- Many plants within the cages were intentionally put into pots. This was to ease relocating them from location to location as well as for transplanting when they died. These plants offer many advantages to the iguanas. Not only do they add shade, natural source of food, in addition, provide visuals of the wild to their captive environment.

- The substrate needs to be constantly monitored for burrows around and under the stones placed within the cages. In the event that an iguana has successfully burrowed underneath any of the stones, this situation should be addressed immediately. The stone should be moved, all dirt that was under the stone should be moved and the stone should be re-positioned so that it has full contact with the limestone base of the cage. The dirt can be filled in around the sides and it should be checked to make sure that the rock does not wobble in any manner.

- The wire screen which makes up the walls and ceiling of the cages should be checked often for tears and excessive wear. Where there is a tear or a worn area, a wire patch must be put in place. The wire will deteriorate, rust and disintegrate with time, so the patching exercises will continue to occur; and it is important to address them as soon as the weakened areas are noticed.

Clean areas and eliminate pests

- Clean hide boxes, basking areas and ground surfaces of any lizard waste. Cleaning off the hide boxes and basking areas can either be accomplished with a hand brush or in some cases with stubborn areas, it will be necessary to use a scrub brush. Using diluted Nolvasan (chlorhexidine) will also aid in disinfecting- but do remember to rinse thoroughly. The ground surface should also be cleaned of any waste, using either the hand brush or rake.

- It will also be important to open the lid of the hide boxes and clean the lid's inside surface. The dirt inside the box should also be sifted and checked for debris or mold buildup.

- It is important to keep all pests out of the iguana cages. This includes mice, snakes, cockroaches, beetles and scorpions to name just a few. These pests carry diseases and parasites that could in fact be harmful to the iguana.

Environmental Extremes

- Environmental extremes can be fatal to an iguana. Too much heat without water to drink can cause hyperthermia, heatstroke and excessive dehydration can lead to disaster and death. Likewise too much cold (constant temperature below 50°F) can lead to a slow down of the iguanas system and ultimately lead to death. Continuous rainfall and high winds too can cause havoc. The keepers need to remember that the animals in the wild can flee to adequate areas of cover (under bushes, trees, tunnel systems, etc.) the iguanas within the headstart facility do not have this advantage. When such environment extremes occur, the keeper needs to be creative and act quickly to offer cover for the caged animals. Large palm trees leaves (thoroughly cleaned and devoid of all parasites and mites) would make an excellent roof on the cages to create shade in excessively hot times, or shield off downpours of rain and wind. Other options include tightly woven synthetic mesh or screen. These options need to be evaluated and outlined to keepers so that when the need arises, the effective plan can be implemented.

Disruption and Stress

- Each time the cages are entered, the iguanas will feel stress. Even the normal routine of food, water and cleaning is very disruptive to their psyche- not withstanding when they need to be caught or handled. The keeper needs to understand that the iguanas natural reaction when threatened or frightened is to flee. Even though routine measuring and examination is important, the iguana is convinced that if it is caught it will be eaten. The fear level is extreme and can be life threatening to the iguana. When handling the iguanas this level of fear needs to be taken into consideration. The keeper must get in, do his business and exit as promptly as possible to enable the iguana to calm down and regain its' composure.

Review list on animal behavior:

- Individual or group displaying excessive aggression
- Animals show signs of fear or stress in current environment
- Animal aggressive display with adjoining cage's occupants

Aggression

- If an iguana is noticed behaving in an assertive and aggressive behavior and dominating the other occupants in the cage then the troublesome one will have to be relocated to a suitable cage. The cage dynamics are of a critical balance, the adding of a new iguana to a cage can be extremely disruptive. The iguana must be of similar size, weight and demeanor to the current habitants of the cage, otherwise the relocation will not work.

Signs of Stress

- An animal that is ill or under undue stress will begin to show visible physical signs of weakness or frailty. The animal will begin to behave like an outcast; it will eat less or not at all. It will start to lose weight and may even have bite marks from being intimidated and picked on by its cage-mates.

Adjoining Cage Aggression

- If there is noticeable aggressive behavior between iguanas between in cages (for example 5 to 6, 4 to 5, etc) the remedy is to install a fine mesh screen on each of the sides as this will further support their common wall and create more of a visual barrier between the two cages.

Review critical care plan:

- Remove and isolate sick or weaker animals for thorough evaluation of the individual
- Clean isolation area for new arrival or sick must be available
- Guidelines for the care and management of this area must be in place and reviewed by everyone
- If animal dies, preserve and remit for post evaluation
- Action plan must be devised and in place for emergency care, transport or cleanup (if outbreak occurs).

Illness or Injury

- A sick or injured animal must be removed from the cage immediately. If the animal is showing signs of illness (thin, heavy breathing, dullness in eyes) isolate this animal into a cage of its own. Immediately contact the veterinarian for intermediary care and make arrangements for transportation of the animal to the veterinarian for care. The animal must be kept warm (at least 85°F) during the segregation and transportation to Tortola.

- If the animal becomes injured, the keeper needs to review the injury for action. If there is a tear or break in the skin (often caused by biting) the keeper needs to review the wound. Is it bleeding? Is a portion of the skin torn and flapping? If possible, the keeper should flush the wound with Betadine solution and then bandage the wound. The keeper should then immediately transport the animal to the veterinarian for suture treatment, etc. In the event of a broken limb, again the keeper needs to examine the injured area, secure the entire animal securely in stocking-net material (do not attempt to wrap the fracture) and transport the animal to the veterinarian immediately. The animal must be kept warm (at least 85°F) during the segregation and transportation to Tortola.

- Unfortunately there is no local veterinarian on Anegada, so all ill and injured animals must be transported to Tortola for treatment. Therefore, the keepers need to have the ability to make the judgement call on an illness or injury and expedite transportation of the animals.

- Refer to the First Aid and Emergency Care section in this manual for detailed instructions on specific care for each injury or illness.

Sick/Injured Returnee

- An animal that is returned to the headstart facility for recovery by the veterinarian must be placed is a clean and solitary cage. This animal will require additional time and attention to ensure a speedy and full rehabilitation. The enclosure will need to be checked may times a day for debris and waste, as well and the animal to ensure the bandage is still clean and in place. All guidelines and instructions given by the veterinarian must be followed closely.

Monitoring and Maintenance

- A critical task of the headstart facilities keepers is the day to day observance and monitoring of the iguanas, as well as their basic care. As part of this monitoring it is important to record the growth process. These records show how well the care is being administered and how well the wild iguanas are adapting to their temporary confinement during their critical periods of growth. Once a month the keeper must measure and weigh the iguanas and record the current readings. These readings should also record both the pit tag number as well as the color coded bead marking.

Measuring (SVL, TL)

- Measurements should be taken by SVL (Snout-Vent-Length) and TL (Tail Length). These are two different measurements and should be measured by a soft tape or hard ruler using centimeters as the measurement of preference. The keeper needs to record the first measurement of SVL. This measurement is measured from the tip of the nose to the lower flap of the vent. The second measurement is from this flap to the end of the tail. In the event of a regenerated tail, the measurement should show both the original remaining portion of the tail and then the measurement of the regenerated portion. See Appendix E for a form to record this information. This information must be transmitted monthly to both NPT and ISG for comparative growth analysis and review.

Weights

- Weights should be taken at the same time that the keeper is measuring for SVL/TL. The weight should be recorded in grams and should be recorded on the same document that the other measurements are recorded. See Appendix E.

Death

- In the event of a death of an iguana, please refer to the section on Death of an Iguana, complete the Deceased Iguana Report and Information Sheet found in Appendix D. Contact NPT and ISG with this information. Store the animal properly and await transportation recommendation from NPT or ISG.

HYGIENE

While hygiene of the caged environment is essential to health of the captives, the extent of the preventative or maintenance program must be balanced with the downside of the disturbance created by it. The ideal is to have an enclosure that is easily cleaned with the minimum labor and disruption to occupants. Practical application of frequent disinfecting of these cages is not critical if the fecal and other debris are raked and removed; all food and water must be removed daily. Spoiled foods spread bacteria rapidly; this can lead to entire collection or group suffering severe pathological problems from contaminated food source. Equally, all commercial foods should be stored in airtight, moisture proof containers and maintained in dry, cool environment appropriate for long term storage.

Food spoilage avoided by securing an airtight seal **every** time the container is opened for feeding pellets; Critical Care should be placed in tupperware type container once opened and same procedure followed. Storage of both opened and unopened containers should be within a dry, cool, dark location.

Food left inside the cage **must** be collected daily and all visible remnants picked up; then rake the topsoil to sift additional pieces and remove. This raking can also allow uncollected fragments to sun dry and not to mold. The final stage would be a once per week minimal spray of dilute Nolvasan (chlorhexidine) to reduce fungal/bacterial growth. Dilute per manufacturer's instructions for porous materials or surgical procedures.

Fresh foods

Fresh foods should be washed with a mild chlorhexidine solution or an antibacterial soap and rinsed thoroughly to avoid bacterial and fungal sources.

Water
Water should be supplied fresh daily. Drinking water should be poured into cleaned bowls; the cleaning routine can be use of any antibacterial soap, rinse, treat with a chlorhexidine solution and then a final rinse. A gentle spray of clean water in the cages each day will allow for small moisture collection in crevices and divits on the rocks located throughout the enclosure. Misting the iguanas directly provides further rehydration and aids in skin shedding.

Water/food bowls
The bowls made of metal or crock are best for disinfecting. Hard plastic can harbor bacteria and there is controversy over polymer bleeding (toxin). If bowls are washed separately for each enclosure, the disinfecting process can be streamlined to antibacterial soap and rinse; then returned to that specific enclosure. If the bowls are collected and cleaned together, a multi-step process is required. This would be wash in hot water with antibacterial soap, rinse and soak in chlorine solution for 15 minutes, rinse and air dry. As this requires hot water and is labor intensive, the first procedure would be recommended at the facility. An alternative to the metal or crock bowls (and far less labor intensive) is the use of paper plates. The plates could be collected at the end of the day and then discarded. It is important that these plates only be used once.

Flush out water lines
When possible it is advisable to flush out water lines allowing water to run at least 3 minutes. This water can be utilized for irrigating the outside perimeter plants first. Generally, it is recommended to establish a weekly flushing of lines with solutions designed to kill algae. Care must be taken to thoroughly flush the lines of all chemicals used in this process to avoid accidental poisoning of the iguanas.

When going from one enclosure to another, attention should be on the equipment and personnel in direct contact with the animals. Shoes, clothing, gloves, and hands are direct transmission sources. Conventional precaution in the form of removable footwear(rubber sandals or boots) outside each cage would be recommended. The equipment used to handle or restrain iguanas should be disinfected as well.

Hide boxes, basking areas
All hide boxes, basking areas (wood or otherwise) and other porous surfaces can be disinfected with limited success on a monthly basis and most should be replaced annually (branches and plants in pots). If cage individuals are changed out, thorough cleaning and disinfecting must be initiated and completed prior to any new animals' arrival.

A spray attachment to the hose typically designed for fertilizers and plant food can be used to distribute and treat broad areas with a non toxic, limited disinfectant such as chlorhexidine (Nolvasan); for the hide tubes and wire, a stronger quaternary agent such as Roccal can be used if all animals are removed and remain out of contact until completely dried. Prior to true disinfecting of cages and contents, all organic debris must be removed from surface to be treated either by wire brush or nylon scrubber. In the absence of critical

levels of bacterial build or the suspicion of a problem, the quaternary solution is not prescribed as it can be toxic to animals and can create a situation known as a "super bacteria" resistant to treatment.

Natural Pest
Facility control of natural pests is limited but worthy of mention here. Mice, ants, mites and cockroaches to mention a few, are transmitters for disease and parasites. Control in outdoor facility for ants and cockroaches is perhaps limited to the routine cleanup of foods; ant or roach baits outside the cages at very perimeter of facility; keep vegetation groomed and raked away from cages to prevent hide spots for these pests; encourage natural predator induction such as the geckos and amivas used to control insects. Rodents are carriers of several pathogens; the Salmonella sp. a predominate problem. Bait traps and metal flashing around outside cages can reduce chances of mice nesting inside the enclosures. Snakes are easily controlled with second layer of fine mesh screen.

FIRST AID AND EMERGENCY CARE

The most common emergencies to be anticipated in the facility would fall into standard areas of bleeding, fractures, traumatic injuries due to cage aggression, heatstroke (hyperthermia), convulsions, poisoning and intestinal disorders. The importance of immediate action to address these conditions cannot be overstated.

While many situations may be difficult to determine a true emergency, a caretaker should be guided by instinct and common sense. A veterinarian should handle most true emergencies but immediate first aid to stabilize a critical iguana can be the difference between survival and mortality.

Abscesses

In reptiles, an abscess (localized pus) is hard and filled with white, cheese-like material. The most common areas are around the nose, eyes, mouth and legs.

Action required:

1) Restrain the iguana and open the abscess with a lancet or sterile needle of wide bore.
2) Remove all the debris with curette, moistened Q-tip or other instrument; flush with antibiotic solution such as Betadine or Nolvasan.
3) Fill the cleaned area with antibiotic ointment such as Neosporin.
4) Isolate and observe iguana for 24 hours; if swelling continues or area worsens, seek immediate professional help. The animal may require antibiotics orally or injectable for a few days.

Tumors can resemble abscesses; therefore, if an attempt to open and clean out the lump does not yield the white pus or foreign body, the iguana must be seen by a veterinarian to provide surgical treatment of the tumor or growth.

Bleeding

Bleeding problems are not common in iguanas; the total volume of blood in these juveniles is small so that any bleeding must be controlled immediately. Symptoms of excessive blood loss are depression, weakness, breathing difficulty, unconsciousness and death. Observe cause of bleeding; if a traumatic wound is apparent, observe animal and surroundings. Blood on ground may be passed through feces; blood on face around nostrils can originate from respiratory tract or head trauma causing bleeding into respiratory tract.

Action required:

1) Stop the bleeding by applying pressure direct to the area using sterile medium such as cloth or gauze; if bleeding doesn't stop in a few minutes, get professional help.
2) Clean and dress the wound to prevent further contamination; remove any foreign material; cleanse with hydrogen peroxide or betadine solution(except for eye and internal organs); apply antibiotic ointment
3) Seek attention if this does not correct situation or iguana's condition continues to worsen.
4) If the bleeding is from a toenail or severed tail, restrain the iguana in either a towel or surgical stocking; apply styptic powder and pack the bleeding area. Baking powder can be used in emergency along with direct pressure; continue to monitor the animal for a few hours in an isolation cage to ensure the bleeding has stopped. If blood loss is great or animal is lethargic, take it to veterinarian immediately.

Emergency Feeding

This situation most commonly arises when an iguana is malnourished due to any number of factors or when there has been a medical emergency and the animal's health has been compromised to the point of requiring additional sustenance to survive.

If an iguana is conscious and ceased its struggle while restrained, an emergency solution or slurry can be syringe feed or dropper fed. The slurry should consist of Critical Care mixed with the required amount of pediatric electrolyte or other fluid containing electrolytes. Alternatively, for short-term use, Libby's canned pure pumpkin can be syringe fed. This will provide adequate fiber, moisture and protein for a debilitated iguana; iguanas have progressed well on this food for several weeks following surgery, treatment for malnourishment, disease or other conditions requiring rehabilitative measures.

Hydration can be critical for recovery in a failing iguana. Daily soak in a shallow bath for 5-15 minutes can allow hydration to occur. If the animal will not accept water on its own, small amounts of lactated ringers or dextrose can be administered by subcutaneous injection (under the skin). Good sights for this are in the loose folds of skin from neck, shoulder and upper torso (dorsal) *prior to pelvic girdle*. Care must be taken to restrain the iguana and use a sterile needle for each treatment. Recommended amount would be 20-30ml/kg every 24 hours in juveniles.

Eye Disorders

An eye problem must be treated as serious from the onset. Minor irritation will progress to damage such as blindness. If condition doesn't improve within 24 hours seek professional help. Use only medications specifically for opthamalic use. Observe for signs such as eyelids swollen or closed; excessive blinking or tearing; eye discharges; eyeball cloudiness; rubbing or scratching of side of face or eye. Traumatic wounds or ulcers are painful and serious. Diseases and vitamin deficiency can also create eye problems.

Action required:

1) Examine the eye and remove the cause if visible. Foreign objects can be removed with a moistened Q-tip.
2) Eyeball surface can be flushed with plain tap water or saline solution
3) Antibiotic opthamalic eye medication can be applied several times per day. Important that the preparation does not contain corticosteroids. Alternatively, boric acid eye drops can be applied.

Fracture

Most common are leg fractures; these are generally caused by traumatic injury such as flight mode of escape, cagemate injury or incorrect handling by keepers. Malnutrition and disease can create weak bones susceptible to fracture (metabolic bone disease).

Observe signs of fracture by sudden bruising or swelling at a site; difficulty standing (non weight bearing); awkward position of leg; loss of movement of the leg. Other conditions that resemble a fracture would be luxation (bone out of joint); arthritis (pain associated with inflamed joint); tendon or muscle injury

Action required:

1) Observe for other complications resulting from injury
2) Isolate the iguana
3) Try to provide a quiet environment and remove all hide tubes above floor of isolation cage; alternative housing would be a pet carrier.
4) Seek veterinary attention immediately.

The most important note here is **what not to do**; limit handling as more movement creates more damage to affected area. Further, do not attempt to bandage or splint as an improper bandage causes more harm.

Hyperthermia

Higher than normal temperatures with no hide area or moisture available can induce heatstroke; dehydration due to disease or malnutrition can induce similar condition. Observe excessive open mouth (panting); weakness, collapse or even shock with elevated body temperature (hot, dry skin).

Action required:

1) Remove the iguana from that environment and reduce the body temperature immediately with cold water misting by spray bottle.
2) Encourage the iguana to drink water with a dropper or syringe if necessary; drop on tongue without squirting fluid further into the mouth. Panting lizards can aspirate fluid from the trachea to the lungs. This can set up pneumonia rapidly or worse suffocation immediately.
3) Shock or coma requires immediate professional help.

Intestinal Disorders

Infections are caused by a wide variety of factors such as bacteria, fungi, viruses, parasites, poor nutrition and internal diseases. Stress alone can cause diarrhea. Inflammation of intestinal tract can allow bacteria to easily penetrate the natural barrier and enter the bloodstream; once in the bloodstream, the path leads to other organs such as liver, kidney and lungs. Loss of water, electrolytes and minerals leads to weakness, shock and death if untreated.

Action required:

1) Remove animal and isolate
2) Offer fresh water and food mixed with the Critical Care
3) Kaopectate or Pepto-Bismol can be administered to coat the digestive tract. Dosage should follow 1ml/kg every 6 hours.
4) Observe animal for 24 hours; if rapid improvement does not occur, seek professional attention

Internal parasites, while naturally occurring, can create severe problems in captive animals subjected to stress. If no parasites are observed in feces but the animal has diarrhea and weight loss or bloating, immediate veterinary care needs to be taken. Fecal samples gathered and kept moist in sealed container should accompany the iguana for parasite analysis. If the sample cannot be presented for analysis within 24 hours, fix the sample in a sealed vial containing *2% formalin solution*. Mass (entire population) treatment must not be undertaken without the direct supervision by a professional

Mention here is made of the external parasites; treatment, if they compromise the iguana's health, must be undertaken by a veterinarian; all cage objects must be removed, the area then treated with the correct chemical and all occupants treated prior to their return to the cage.

Other Common Problems

While the list could continue at length; the disorders most likely to be encountered at the facility (captive environment) would involve the eyes, genital areas and miscellaneous swellings.

Poison

While contact with poison at the facility would be limited, toxicity is possible through products on site as well as vegetation accidentally mixed in with feed. Observe for sudden diarrhea, vomiting, convulsions, sudden breathing difficulty or shock.

Action required:

1) Remove suspected substance
2) Remove the iguana and keep quiet in warm environment
3) Seek immediate veterinary care. It is advised to bring the suspected substance, feces and/or vomit.

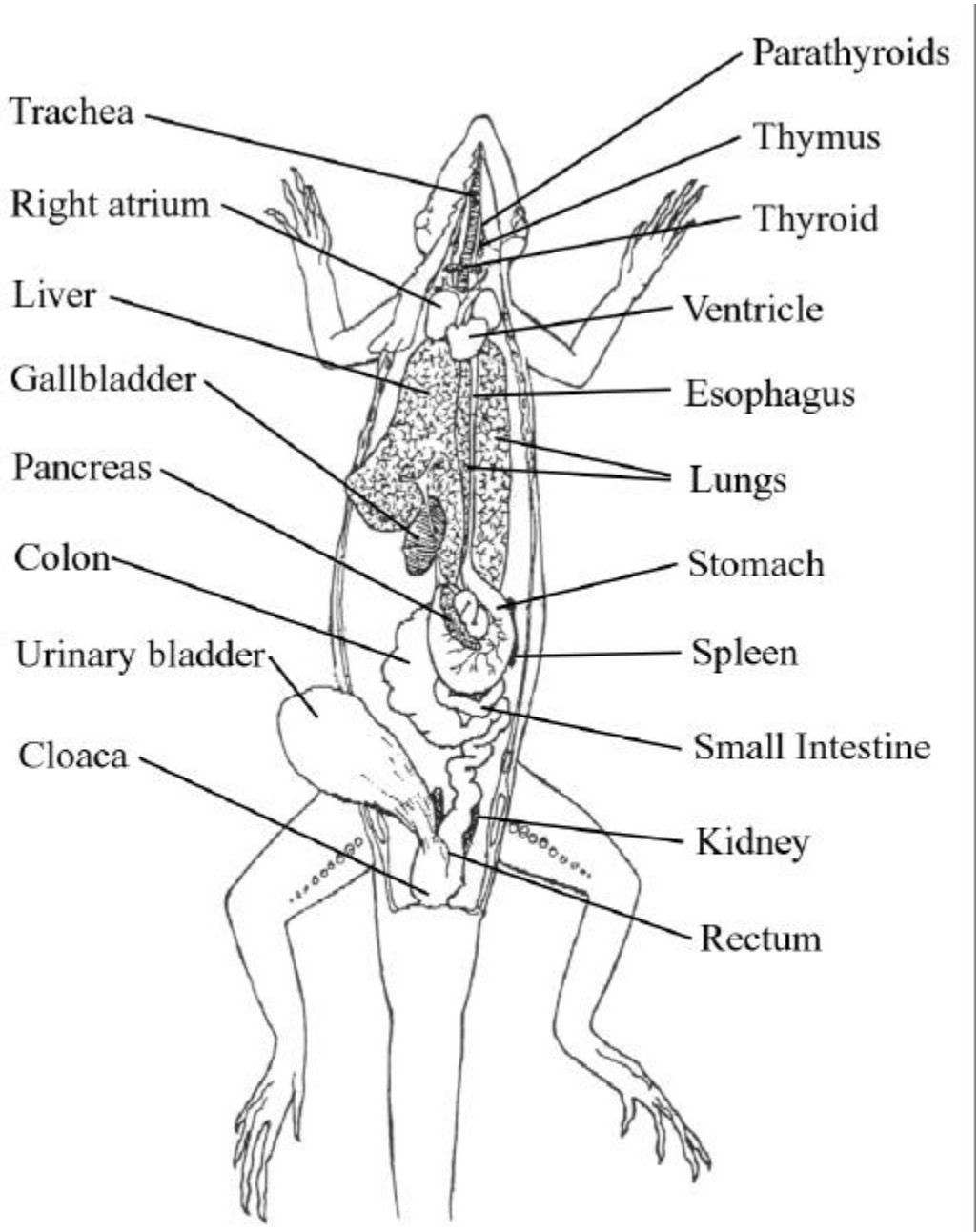
If the animal is conscious and professional care is not immediate, coating the digestive tract with Kaopectate mixed with mineral oil or activated charcoal mixed with mineral oil (several drops) can delay toxin absorption. This mixture can be tube fed or slowly fed with syringe. If animal resists or struggles do not proceed as aspiration might occur.

Urinary/Reproductive Problems

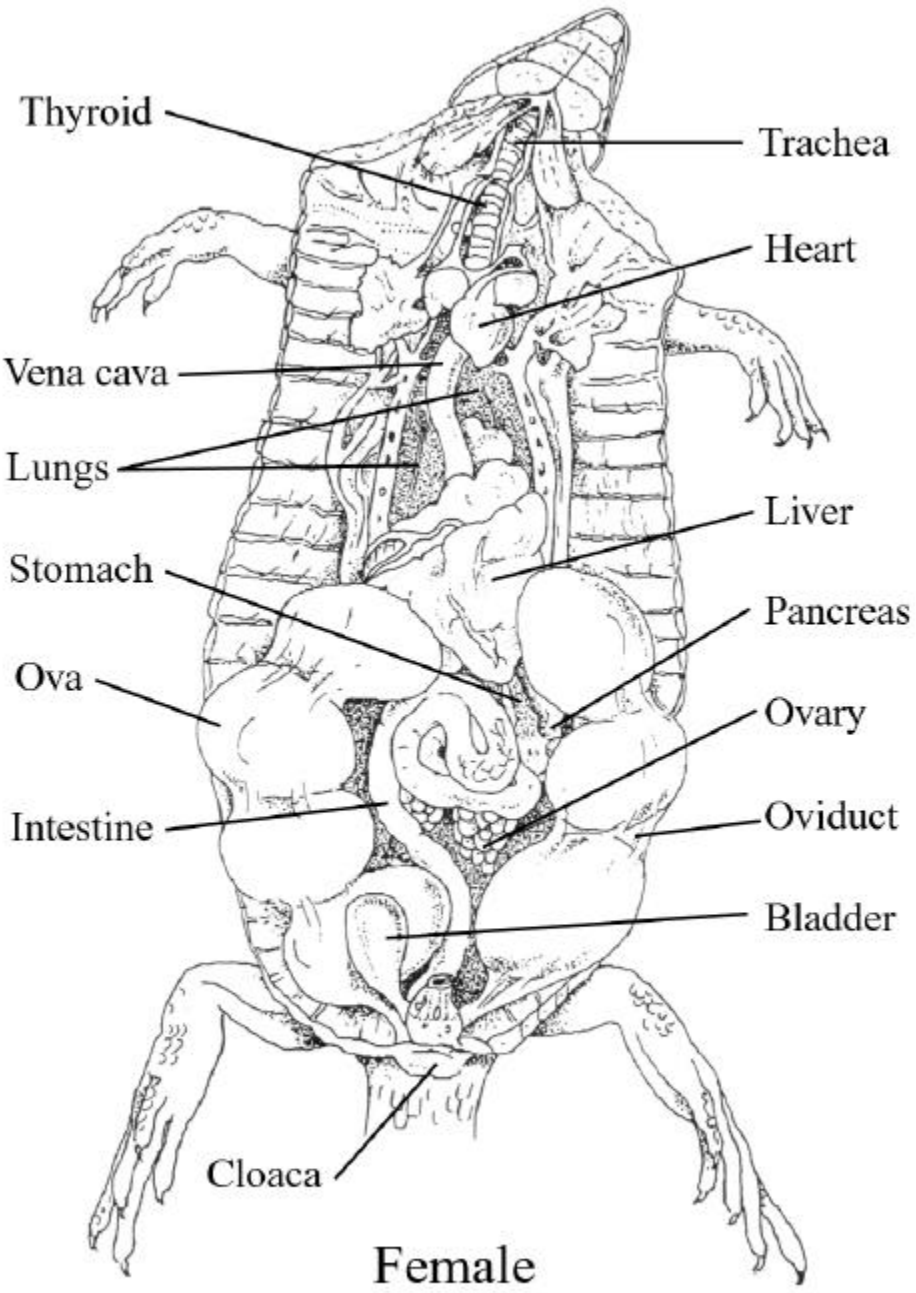
Most are beyond the scope of basic first aid; this means immediate veterinary care must be undertaken. One condition that would be readily apparent is the cloacal prolapse. This is the falling or protrusion of the cloaca tissue through the vent. The cause is excessive straining from persistent and aggravated diarrhea, inflammation of the area or from efforts to pass eggs. A prolapse is an emergency; seek veterinary care immediately.

Action required:

1) Remove the iguana and isolate in warm, calm area.
2) Cleanse area with warm, soapy water; mineral oil or KY lubricant can be applied to aid in softening the tissue.
3) Antibiotic ointment with anti-inflammatory corticosteroids can be applied to tissue to help shrink and keep tissue healthy.
4) Moist, sterile gauze secured in place to prevent drying of tissue is recommended.
5) Transport to veterinarian to suture, treatment and/or surgery.


Parathyroids
Trachea
Thymus
Right atrium
Thyroid
Liver
Ventricle
Gallbladder
Esophagus
Pancreas
Lungs
Colon
Stomach
Urinary bladder
Spleen
Small Intestine
Cloaca
Kidney
Rectum

Male


Thyroid
Trachea
Heart
Vena cava
Lungs
Liver
Stomach
Pancreas
Ova
Ovary
Intestine
Oviduct
Bladder
Cloaca
Female

Handling, Lifting, Carrying: *Care and Techniques*

Touching, petting and handling is not a normal part of communications between iguanas; therefore, the iguana can only perceive these actions as an attack or threat to its well being. The keeper must remember that while he is attempting to catch the iguana to administer medicine, take weights and measurements, view overall health and condition, he is also subjecting the iguana to an incredible amount of stress during this time. The keeper must exercise care and calmness when he is in the iguana cage, especially when he is attempting to capture the iguana. The iguana will naturally flee so the keeper's technique should be persistent yet gentle . Too often damage is inflicted on a frightened fleeing iguana resulting in the loss of a claw, digit or tail.

It is important to understand the natural motions of the iguanas in both a calm state and in a flight state. Under natural calm conditions, the iguana tends to be most comfortable and secure at an elevated height; resting on a tree branch, or in the case at the headstart facility, in the black plastic hide tubes or hanging on the wire sides of the cages.

The rear limbs of the iguana have elongated digits that enable ease of climbing. Each digit has a claw that uses a lock-release action. As the iguana descends down the cage or branch it has complete control of speed and balance due to this lock-release mechanism. The iguana will also use its tail to aid in its descent. When the iguana is frightened it will tighten its grip thereby pressing its claws further into the climbing surface. These natural behaviors are important to note when trying to remove an iguana from a tree branch or a persons arm. Extreme care must be taken in removing the claws from the surface they are gripping as the digits and nail beds are fragile and thus easily damaged. To release the claw from its surface, carefully put a finger under each foot or digit and lift gently.

In attempting to capture the iguana never grab it past the hind legs as you most assuredly will end up with a wiggling tail in hand and a fleeing injured iguana. The safest approach would be to place one hand above the front shoulders and other hand underneath mid pelvis for restraint or grab with the iguana's head between thumb and index (or index and middle finger), the

remaining fingers will restrain the iguana around upper torso. The other hand supports the entire iguana from underneath. Once captured, the iguana will twist and wiggle in an attempt to gain freedom; a gentle and firm grip is critical.

When grasping an iguana's limbs do not exert excessive force on the lower portion of the limbs, i.e. the hands or feet, because it is relatively easy to cause fractures of the upper segments (the arms or thighs, respectively).

Death of an Iguana

It is just as important to understand the death of an iguana as it is to remain current on health care and physical examinations. Determining the cause of one death can often help to prevent future deaths. It is a good habit to perform routine postmortem examinations on all deceased iguanas even when the cause of death is known.

A thorough examination is less significant if the deceased animal has not been handled or prepared properly. The most reliable results will be those taken from a recently dead iguana or one that has been stored in a chilled environment (refrigerator) for less than 24 hours. Freezing the specimen causes tissue damage and may be unsuitable for many of the diagnostic and histopathological procedures. Upon finding a deceased animal it is critical that the animal be sent immediately to the veterinarian for examination.

All veterinary examinations require transportation to Tortola; thus, it is critical that the animal be cared for properly. Preserve the specimen in a sealed container (jar) with 2% formalin solution (formalin is a 37.5% solution of formaldehyde), dilute the formalin with 49 parts water to one part formalin. It is recommended that the veterinarian on Tortola prepare this solution for the headstart facility immediately. Once the animal has been secured and placed in the formalin solution it should remain refrigerated until the time of shipment. Place the container in a small portable ice chest packed with chill packs or ziplock bags filled with ice to maintain an appropriate cool temperature during the flight. Arrange for a pickup on the island of Tortola to ensure that the animal gets to the veterinarian in a timely manner.

This allows for temporary storage of the specimen and more detailed pathological work (histological sections can be made on formalin-preserved tissues, not on most alcohol-preserved tissues). It is also recommended that the veterinarian in Tortola keep a tissue sample (toe, tip of tail, even a piece of skin, liver and/or muscle in necropsied animals), placing it in 100% **ethyl alcohol**. Do not use rubbing alcohol. This provides indefinite

storage of the specimen(s) and can be used for DNA analysis. The information will be useful to the Anegada Headstart Project in determining levels of genetic diversity, parentage, and inter/intra species' relationship.

Preparing the dead iguana for shipment to Tortola for evaluation must include completion of the Deceased Iguana Report and Information Sheet (see sample in Appendix F); the report must accompany the animal. All areas should be filled out to the best of the keepers' ability including pit-tag data, color coding, age, size at time of death (measurements and weights), feeding data, cage description and observations, animal observations, suspected cause of death. This information is critical to the understanding or possible reasons for death and to establish prevention guidelines.

If a deceased iguana is found in the field and it is not excessively decomposed, it too should be transported to the veterinarian for examination. This animal should be preserved in a 10% formalin solution. Because this kind of a find will have already surpassed its prime time for examination, the preservation fluid needs to be of a stronger concentration, (dilute the formalin with 9 parts water to one part formalin).

SUMMARY

In developing a successful husbandry plan for *C. pinguis*, the keepers must try to view the world from the iguana's perspective; when this is done, caretakers should have a greater empathy for the psychological and physical needs of the animal. If the complete needs of the *C.pinguis* aren't met-- nutritional, environmental and emotional-- disease is an inevitable conclusion.

The importance of the keeper to the facility's success is in the multitude of jobs he accomplishes. "Aside from having a major role in population health assessment, the individual may function as an expert in animal capture and handling, a diagnostician, a pathologist, a researcher, a teacher, a manager …. and public-relations person." *Albert W. Franzmann, DVM, Ph.D.*

APPENDIX LISTING

Appendix A

Common Nutritious Locally Available Plant Sources

(Common Names Only)

Buttonwood

Blackwood

Barrel Cactus Fruit

CowBerry

Grovenite

Maidenberry

Guanaberry

Nutmeg

Parrotwood

Purple Sage

Saltwart

Slowberry

Spiceberry

Tomberry

White Cedar

Appendix B

Common Nutritious Commercially Available Plant Sources

Some commercially available (and home-grown) vegetable food items that are safe and nutritious for herbivorous reptiles:

Alfalfa:	fresh, sun-cured hay, dried leaves, pellets, meal.
Apple:	fresh, with peel, sliced or grated (discard core and seeds).
Barley:	freshly sprouted seeds, freshly grown leaves, sun-cured hay.
Beans:	(several edible varieties): fresh leaves and stems, fruit.
Bean sprouts:	fresh leaves, stems, blossoms, fruit.
Beet:	tops, stems, flowers, grated roots.
Buffalo grass:	(*Bulbilis dactyloides*); hay.
Cabbage family:	(kale, napa, broccoli, Brussel's sprouts) **do not feed to excess**.
Cactus:	flowers, prickly pears, tender young cactus pads.
Carrot:	leaves, grated root.
Clover:	(Ladino, Alsike, etc.); fresh, sun-cured hay.
Collards:	fresh green leaves, flowers.
Cotton:	leaves, dried or fresh.
Cowpea:	sun-cured hay, leaves.
Crucifers:	bok choy, etc.
Dandelion:	leaves and stems, flowers, fresh or dried.
Dicondra:	fresh or sun-cured hay.
Eugenia:	fresh leaves, fruits.
Figs:	fresh.
Grass clippings:	freshly mowed or sun-cured.
Hibiscus:	leaves, flowers, fresh pods.
Kudzu:	sun-cured hay.
Lespedeza:	sun-cured hay, leaves.
Millet:	leaves, sun-cured hay.
Mint:	sun-cured hay.
Mixed vegetables:	frozen, thawed.
Mulberry:	freshly picked tender leaves, fruit.
Mustard:	fresh green leaves, flowers.
Nasturtium:	leaves, stems, flowers.
Okra:	fresh, chopped.
Pea:	fresh pods, sun-cured hay.
Pear:	fresh, cut or grated (discard core and seeds).
Peavine:	sun-cured hay.
Peanut:	sun-cured hay with or without nuts.
Pelleted commercial:	(Purina, Wayne, Zoomed) **those formulated for horses, goats, dogs, cats or monkeys should not be fed**

Rape:	fresh leaves, sun-cured hay.
Rutabaga:	freshly grated root.
Saltbush:	(winter range); sun-cured hay.
Soybean:	fresh leaves or sun-cured hay.
Squash:	freshly grated flesh, blossoms, tender leaves.
Stone fruits:	peach, nectarine, apricot, plum, etc.
Sunflower:	seeds (unsalted)
Timothy:	sun-cured hay.
Tofu:	soybean cake.
Triticale:	freshly sprouted seeds, sun-cured hay.
Turnip:	fresh leaves, grated root.
Vetch:	sun-cured hay.
Wheat:	(soft wheat berries); freshly sprouted, hydroponically grown.

Appendix B Information taken from: Frederic L.Frey, D.V.M., M.S.(1991).REPTILE CARE, An Atlas of Diseases and Treatments, Volume I, P 90.

Appendix C

Keepers Daily Log

Cage # _____

Date_____ Day_____Temp/Type _____

_____ Morning Review of Cages: OK Needs Attention (Circle One)

_____ Prepared food. Consisted of: _____

_____

_____ Distributed food # of plates_____

_____ Distributed water

_____ Head Count

_____ Iguana review

_____ Cleaned basking areas/ground

_____ Cage review (looking for tears, breakage, etc.)

_____ Watered outside plants

_____ Watered food boxes

_____ Mid-afternoon viewing of food (replenished, moistened)

_____ Afternoon food and water bowl removal

_____ Count and visual of iguanas

_____ Clean cages of food debris and animal waste

_____ Scrub food bowls

_____ Scrub water bowls

Additional Comments:_____

_____

_____

_____

_____

_____

_____

_____(Keeper)

Keepers Daily Log

- *Sample Document*

Cage # 1A

Date 10/15/01 Day Monday Temp/Type 95°F/Sunny& Humid

v Morning Review of Cages: OK Needs Attention (Circle One)

v Prepared food. Consisted of: Calalu, maidenberry, pellets, hibiscus, berries

v Distributed food # of plates 3

v Distributed water

v Head Count

v Iguana review

v Cleaned basking areas/ground

v Cage review (looking for tears, breakage, etc.)

v Watered outside plants

v Watered food boxes

v Mid-afternoon viewing of food (replenished, moistened)

v Afternoon food and water bowl removal

v Count and visual of iguanas

v Clean cages of food debris and animal waste

v Scrub food bowls

v Scrub water bowls

Additional Comments: Noticed aggression between RR/RR and BK/BU. They are in cage 6. RR/RR bit BK/BU, but no visible injuries. Will continue to watch for aggression.

Sandy-sample (Keeper)

Appendix D

FIRST AID AND EMERGENCY CARE CHECKLIST

Pit Tag ID:_____ **Date Found in Condition: _____**

Color Code:_____ **Cage Locator:_____**

Age:_____ **SVL: _____TL:_____** **Weight:_____**

Type of illness or injury

_____ **Abscesses**
_____ **Bleeding**
_____ **Emergency Feeding**
_____ **Eye Disorders**
_____ **Fracture**
_____ **Hyperthermia**
_____ **Intestinal Disorders**
_____ **Other Common Problems**
_____ **Poison**
_____ **Urinary/Reproductive Problems**

Treatment Administered:_____
_____
_____
_____
_____
_____
_____
_____(Keeper)

Date transferred to Vet:_____
_____

Vet instructions:_____
_____
_____

FIRST AID AND EMERGENCY CARE CHECKLIST

- *Sample Document*

Pit Tag ID: 1BF405D **Date Found in Condition:** 10/05/01

Color Code: G/OY **Cage Locator:** Cage 1B

Age: 28 months **SVL:** 17.3cm **TL:** 28.2cm **Weight:** 315 grams

Type of illness or injury

_____ **Abscesses**
_X_ **Bleeding**
_____ **Emergency Feeding**
_____ **Eye Disorders**
_____ **Fracture**
_____ **Hyperthermia**
_____ **Intestinal Disorders**
_____ **Other Common Problems**
_____ **Poison**
_____ **Urinary/Reproductive Problems**

Treatment Administered: Animal showed signs of being bitten on the nape of the neck..There was a large gash 5 spikes down from the top of the head. Removed animal from the cage and flushed the wound with water and betadine. Wrapped the iguana with guaze from guaze roll completely around spines to belly 3 times to secure would. Then further secured iguana into stocking-net. Called vet, will transport out on next flight. Keeping animal heated and calm until morning flight.

Sandy-Sample (Keeper)

Date transferred to Vet: 10/06/01, 8:15am flight to Tortola

Vet instructions: Animal still at vet, awaiting treatment, diagnosis and recommendation.

Appendix E

Weights and Measurements WorkSheet

Cage #_____ Date _____

Pit Tag #	Color	Weight	SVL	TL	Comments

Weights and Measurements WorkSheet

-Sample Document

Cage #3A Date October 5, 2001

Pit Tag #	Color	Weight	SVL	TL	Comments
1BF405D	BU/BK	315g	22.3	28.2	Condition: good
1BG312D	G/R	325g	23.3	29.3	Condition: excellent
1CF414D	RR/YR	295g	20.6	24.1	Condition: good
1BS205D	Y/G	305g	20.9	13/18.5	Regen tail
1BF409G	BK/BK	345g	23.0	30.3	Condition: excellent
1B2235D	W/O	325g	21.3	27.3	Condition: good
1SF605D	RG/YW	265g	22.3	30.5	**See below

** Significant weight loss recently. Being picked on by others- Should be moved to different cage for well being

Appendix F

Deceased Iguana Report and Information Sheet

Species: _____ **Pit Tag ID:** _____

Date Found in Condition: _____ **Color Code:** _____
Cage Locator:_____

Age:_____ **SVL:** _____**TL:**_____ **Weight:**_____

Condition Found: **Deceased** **Dying in Process** (Circle One)

Animal Description: _____
_____
_____
_____
_____

Previous Health Issues/Conditions: _____
_____
_____

Feeding Data (Diet, frequency of feeding, source of food, anything unusual):
_____
_____

Additional information: _____
_____
_____

Preservation Method: _____
_____

Taken to Tortola by: _____ **Date:** _____

Keepers Signature: _____ **Date:** _____

If necessary use backside of this form for additional information

Deceased Iguana Report and Information Sheet

- Sample Document

Species: Cyclura pinguis **Pit Tag ID:** 1BF405D

Date Found in Condition: 10/05/01 **Color Code:** G/OY
Cage Locator: Cage 1B

Age: 28 months **SVL:** 17.3cm **TL:** 28.2cm **Weight:** 315 grams

Condition Found: **Deceased** **Dying in Process** (Circle One)

Animal Description: Animal was found dead in burrow box. Blood is noticeable around mouth area. Feels quite stiff, seems to have died last night. Eyes are sunken, mouth is partially opened

Previous Health Issues/Conditions: None noticed, Animal in cage also seemed to get along with cage mates just fine.

Feeding Data (Diet, frequency of feeding, source of food, anything unusual):
Chopped Calalu, Maidenberry, Cactus Fruit, with 20% Zoomed pellets.

Additional information: Island temperature has been quite warm to hot over the past month, (103°F to 106°F). There has been no rain, no humidity and no wind. Animals are continuously seeking shade.

Preservation Method: Initially stored in ziplock baggie and placed in refrigerator. (2 days)- Trip to Tortola delayed, transferred animal to formalin solution for longer term storage

Taken to Tortola by: Raymond - Sample **Date:** 10/25/01

Keepers Signature: Sandy - Sample **Date:** 10/25/01

If necessary use backside of this form for additional information

Appendix G

Glossary and Definitions

ambient	localized surrounding temperature
anorexia	refusal to eat, lack of appetite
arboreal	living and climbing in tall hedges or in trees
atrophy	the shrinking in size of organs or tissue
bask	the body absorbs warmth from the sun or radiant light
calcareous	having a high calcium makeup
carnivorous	meat (flesh) eating
carrion	dead and decaying flesh
caudal	refers to the tail end
cloaca	the area where the digestive, urinary and reproductive systems empty, opens through the vent (anus).
constipation	unable (or difficult) to defecate or pass feces
cranial	head (skull)
dermal	pertains to the skin
dewlap	the folds and loose skin on the lower jaw
diurnal	awake and active during the daytime
dorsal	upper area of the back
dysecdysis	poor shedding
dyspnea	having trouble breathing
ecdsis`	the process of shedding
ectothermic	body heat from outside sources (cold-blooded)
endothermic	body heat from inside the body (warm-blooded)
femoral pores	pores on the underneath areas of the back legs
flora	plant
folivore	leaf-eating
granuloma	an infected or parasitic lesion or abscess
gravid	pregnant
gular	throat area
hemipenes	the two male copulatory organs
herbivorous	feeds on plants or vegetables
inanition	starvation due to absence of food
ingesta	food that has been swallowed
insectivorous	insect eating
inspissated	especially dry (not normal)
invertebrate	absence on a backbone or vertebra
Jacobson's organ	scent organ located in the roof of the mouth below the nose
lamellae	the tiny rows (spikes) underneath a lizards foot
mandible	bottom jaw
mastication	chew
middorsal	the middle of the back

midventral	the middle of the stomach
necropsy	the examining of the deceased (corpse)
neoplasm	recent growth, new tumor
nephrotoxic	harmful to kidneys chemically
neuropathy	disorder of the nervous system
nocturnal	awake and active during the nighttime
obstipation	part or full blockage of feces when passing through the intestine
omnivorous	eating of both meat and plant material
osteomalacia	bone softening
pathogen	organism that causes disease(s)
plasma	the un-clotted blood
postmortem	following death
radiography	X-ray
renal	pertaining to the kidney
rostal	nose area
subcutaneous	under the skin
SVL	snout-vent-length, measurement from the tip of the nose to the vent
terrestrial	living on the ground
tympany	bloated with gas
urates	urine salt
urolith	urinary bladder stone
vent	opening under the tail, anus, opening to cloaca
ventral	underneath

Appendix H

Critical Care / Zoomed Ingredients

Critical Care for Herbivores, A complete syringe feeding formula for convalescing small herbivores.

Guaranteed Analysis:

Crude Protein	min	16.00%
Crude Fat	min	3.50%
Crude Fiber	max	23.00%
Calcium	min	.40%
Calcium	max	.60%
Phosphorus	min	.25%
Salt	min	.50%
Salt	max	1.00%
Iron	ppm	184
Copper	ppm	5
Zinc	ppm	64
Niacin	mg/kg	42
Vitamin A	IU/kg	2143
Vitamin D	IU/kg	717
Vitamin B12	mg/kg	4.20
Vitamin C	mg/g	3
Digestible Energy	kcal/g	2.69

Ingredients: Timothy meal, Oat groats, Soybean hulls, Wheat germ meal, Wheat middlings, Soybean meal, Molasses, Monophosphate L-ascorbic acid, Vitamin A acetate, Vitamin D3 supplement, Vitamin E supplement, Menadione Dimethyl pyrimidinol, Bisulfite (Vit K), Riboflavin, Niacin supplement, Calcium Pantothenate, Vitamin B12 supplement, Biotin, Thiamine, Sodium Chloride, Potassium Chloride, Magnesium Chloride, Calcium Chloride, Xanthan Gum, Lactobacillus sporogenes, Lactobacillus Bulgaricus, Lactobacillus plantarium, Streptococcus faecium, Lactobacillus acidophilus, Papaya, Pineapple, and Natural Flavors.

Zoo Med's All Natural Juvenile Iguana Food, A complete diet

Guaranteed Analysis:

Crude Protein	min	24.00%
Crude Fat	min	6.00%
Crude Fiber	max	12.00%
Moisture Content	max	15.00%
Ash Content	max	9.00%

Ingredients: Sun-Dried Alfalfa, Wheat Bran, Soybean Meal, Collard Greens, Mustard Greens, Kale, Spirulina, Glycerin, Natural Flavors, Beta Carotene, Vitamin D3, Vitamin A Acetate, Vitamin B12 Supplement, Riboflavin, Niacin, Folic Acid, Menadione Sodium Bisulfite Complex (Vitamin K), Calcium Pantothenate, Pyridoxine Hydrochloride, Thiamine, Biotin, DL Alphatocopherol (Vitamin E), Stable Ascorbic Acid, Choline Chloride, Cobalt Sulfate, Copper Sulfate, Ferrous Sulfate, Manganese Sulfate.

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