

## TABLE OF CONTENTS

### **CHAPTER 1: Introduction**

Natural History of Bats.....	1
Health Precautions.....	2
Identification.....	3
Crevice Bats.....	3
Tree Bats.....	4
Table 1. Roosting and Hibernating Patterns.....	5
Behavior.....	8
Emotion.....	8
Communication.....	9
Being Individual.....	9
Big Brown Bats.....	10
Myotis Bats.....	10
Evening Bats.....	10
Silver-haired Bats.....	11
Pipistrelle Bats.....	11
Pallid Bats.....	12
Free-tailed Bats.....	12
Big-eared Bats.....	13
Hoary Bats.....	13
Red Bats and Seminole Bats.....	14
Yellow Bats.....	14
Age and Longevity.....	15
Notes for the Handler.....	18

### **CHAPTER 2: Wild Bats Entering Captivity**

Gathering and Transporting.....	20
Intake and Initial Exam.....	20
General Information.....	21
Eyes First, Respiration Second.....	21
Exam Third.....	21

### **CHAPTER 3: Temporary Housing**

Quarantine.....	24
Crevice Bats (Adults and Pups).....	24
Tree Bats (Adults and Pups).....	24
Quarantine Housing.....	25
Cube Cage.....	25
Bat Hut.....	25
Breeze Cage.....	25
Cage Modifications.....	26

Temperature, Humidity and Lighting.....	28
General Information.....	28
Permanent Humidity Chamber.....	28
PVC-Framed Humidity Chamber.....	29
Lighting.....	29
Marking Captive Bats for Identification.....	30
Unacceptable Marking Methods.....	30
Leg Banding.....	30
Wing Banding.....	30
Neck Bands.....	31
Body Piercing.....	31
Toe Clipping and Ear Notching.....	32
Freeze Branding.....	32
PIT Tags.....	32
Acceptable Marking Methods.....	32
Fur Clipping.....	32
Tattoos.....	33
Non-Toxic Paints.....	33
Washable Markers.....	34
Natural Marks.....	34
Daily Examinations.....	36
Table 3. Captive Colony Checklist.....	37
Introducing New Bats to Cage Mates.....	38
<b>CHAPTER 4: Enrichment and Security</b>	
Flighted and Non-Flighted Bats.....	39
Crevice Bats.....	39
Roostmates.....	40
Table 4. Crevice Bat Roosting Patterns.....	41
Furniture.....	43
Roosting Items for Crevice Bats.....	43
Cleaning.....	44
Vivarium Foam Products.....	45
Modifying Vivarium Foam Products for Bats.....	46
Cleaning.....	46
Additional Roosting Items for Crevice Bats.....	47
Tree Bats.....	48
Roostmates.....	48
Furniture.....	49
<b>CHAPTER 5: Dishes</b>	
Mealworm Dishes.....	51
Crevice Bats.....	51
Tree Bats.....	53
Water Dishes.....	54

**CHAPTER 6: Permanent Housing and Flight Cages**

Housing for Non-flighted Crevice Bats..... 55  
Housing for Non-flighted Tree Bats..... 59  
  
Temporary Indoor Flight Cages..... 60  
Permanent Flight Cages..... 61  
    Flight Cage Sizes..... 61  
    Entryway..... 61  
    Construction Materials..... 61  
    Walls..... 62  
    Cleaning..... 62  
    Flooring..... 63  
    Ceiling..... 63  
  
Housing for Flighted Crevice Bats..... 64  
    Cave Roost..... 64  
    Feeding Shelves..... 67  
    Cleaning..... 67  
  
Ill Fated Designs..... 68

**CHAPTER 7: Feeding Adult Bats**

General Information..... 69  
    Table 7-1. Plants that May Provide Nutrients to Bats Through Insects..... 69  
  
Mealworms..... 71  
    Mealworm Medium..... 71  
    Preparing Mealworms for Self-feeding Bats..... 72  
  
Hand-feeding Adult Bats..... 73  
Teaching Adult Bats to Self-feed..... 74  
    Crevice Bats..... 75  
    Tree Bats..... 75  
        Additional Notes..... 76  
        Feeding Crickets..... 76  
  
The Bat World Sanctuary Complete Soft Food Diet..... 77  
    Recipe..... 77  
    Additional Notes..... 78  
    Table 7-2. Complete Soft Food Duet Nutritional Analysis..... 79  
  
Proper Feeding Technique, Crevice Bats..... 80  
Proper Feeding Technique, Tree Bats..... 81  
Improper Feeding Techniques..... 81  
  
Table 7-3. Average Weights of Insectivorous Bats..... 82

## CHAPTER 8: Mating Behavior and Reproduction

Mating Behavior .....	83
Table 8-1. Select data on a Captive Reproductive Colony of <i>Tadarida brasiliensis</i> ...	85
Orchiectomy.....	86
General Information.....	86
Procedure.....	86
Caring for Pregnant and Lactating Females.....	87
General Information.....	87
Care During Pregnancy.....	88
Normal Birth.....	88
Difficult Birth.....	89
Caesarean Section and Ovariohysterectomy.....	92
Captive Mothers with Pups.....	93
Crevice Bats.....	93
Tree Bats.....	93
Notes on Rescuing Tree Bats with Pups.....	94
Other Complications.....	94
Hypocalcemia.....	94
Mastitis.....	94
Table 8-2. Number of Young Per Year.....	96

## CHAPTER 9: Feeding and Care of Infant and Geriatric Bats

General Information Regarding Bat Pups.....	97
Feeding Schedule.....	98
Important Notes.....	99
Feeding Crevice Bat Pups.....	100
Vespertilionidae.....	100
Molossidae.....	100
Housing Crevice Bat Pups.....	102
Feeding Tree Bat Pups.....	103
Housing Tree Bat Pups.....	103
Bathing and Grooming Tree Bat Pups.....	104
Bat World Sanctuary Milk Replacement Recipe.....	105
Vespertilionidae.....	105
Molossidae.....	105
Table 9-1. Comparison of Bat Milk Compositions.....	106
Table 9.2 Pup Survival Rates for Select Milk Replacement Formulas.....	107
Complications in Hand Raised Pups.....	108
Bloat.....	108

Feeding too Often.....	108
Overfeeding.....	108
Lack of Beneficial Bacteria.....	109
Malnutrition.....	109
Gastric Torsion.....	109
Metabolic Bone Disease.....	109
Other Complications.....	110
Injuries.....	110
Feeding Juvenile Bats.....	110
Caring for Geriatric Bats.....	111

## **CHAPTER 10: Routine Therapies**

Injection Techniques.....	112
Oxygen Therapy.....	113
Anesthesia.....	114
Blood Sampling.....	115
Bathing and Grooming Adult Bats.....	116
Medications.....	118

## **CHAPTER 11: Diagnosis and Treatment of Illness**

Dehydration and Fluid Replacement Therapy.....	122
Table 11-1. Fluid Replacement Schedule.....	122
Shock.....	123
Respiratory Disorders.....	124
Aspiration.....	124
Pneumonia and Pneumonia-like symptoms.....	124
Anemia.....	126
Infections of the Gums and Teeth.....	127
Eye Infections.....	131
Gastrointestinal Disorders.....	133
Gastritis.....	133
Diarrhea.....	133
Anorexia.....	134
Hepatic Lipidosis.....	134
Urinary Tract Infections.....	135
Skin Conditions.....	136
Facial Secretions.....	135
Fungal Infections.....	136
Wing Wasting Syndrome.....	138
Erosive Dermatitis.....	139
Conditions Caused by Improper Diet and Feeding Techniques.....	140
Parasites.....	141
Ectoparasites.....	141
Endoparasites.....	142

Rabies.....	143
Human Exposure.....	143
Bat Bites.....	145
Clinical Signs of Rabies in Insectivorous Bats.....	145
Differential Diagnostic Chart.....	148

## **CHAPTER 12: Diagnosis and Treatment of Injury**

Anatomy of the Wing.....	155
Membrane Tears.....	164
Open and Closed Fractures.....	165
Stabilizing Fractures with Tissue Adhesive.....	166
Rehabilitation after Fractured Wings.....	168
Injuries to the Shoulder, Elbow and Wrist Joints.....	168
Amputations.....	168
Back Injuries.....	171
Leg Injuries.....	173
Birth Anomalies.....	174
Knee Injuries.....	175
Joint Swelling.....	175
Foot and Toe Injuries.....	176
Blunt Force Trauma.....	178
Punctured Lung.....	179
Bite Wounds.....	180
Adhesive Contaminants.....	181
Heat Exhaustion/Heat Stroke.....	182
Treatment for Heat Exhaustion/Heat Stroke.....	183
Hypothermia and Frostbite.....	184
Treatment for Hypothermia.....	184
Treatment for Frostbite.....	184
Insect Stings and Spider Bites.....	185
Fire Ants.....	185
Wasp and Bee Stings.....	185
Spider Bites.....	186

## **CHAPTER 13: Hibernation, Release and Euthanasia**

Hibernation.....	187
Releasing Bats to the Wild.....	190
Releasing Hand-Raised Orphans.....	190
Releasing Adult Bats.....	191
Euthanasia.....	192
Unacceptable Methods.....	192
Acceptable Methods.....	192
Products.....	194
Metric Conversions.....	195