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How to Care for Orphaned Wild Mammals

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The following information has been derived from the experiences of wildlife rehabilitations specialists, as well as from journals on this topic. It is important to note that information must be adapted to accommodate the individual animal and consultation with a veterinarian is recommended. This is the first of a two-part series of articles.

Introduction

Wildlife rehabilitation is a time consuming and energy demanding endeavor. It can be heart breaking, but also extremely satisfying. Orphaned baby animals require even more time and care.

The purpose of this manual is to give a brief summary regarding the following: 1) Age determination, 2) Nutrition/feeding schedule, 3) Proper housing and management, 4) Handling, 5) Common problems, and 6) Release of some common species. This manual will hopefully save you much needed time from searching through numerous books to find the pertinent information. More specific species information can be researched after the animal has been stabilized. As a veterinarian, you will be seen as an authority on the care and management of many species including wildlife. It would be in your best interest to learn of local licensed wildlife rehabbers, nature centers, and humane societies with wildlife programs to help you with these cases. These rehabbers can take over the care of your wildlife patients when you run out of facilities, time or manpower. In exchange, these local organizations appreciate any information that can be imparted to them on the management and care of these animals.

If wildlife rehabilitation is an endeavor which you are willing to undertake it is highly recommended to obtain your state and federal wildlife rehabilitation permits. The state application

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can be received by writing your State Department of Natural Resources. For a federal application write to:

Application Examiner
U.S. Fish and Wildlife Service
P.O. Box 455
Twin Cities, MN 55111

The state license allows you to work with mammals while the federal license enables you to work with birds.

When dealing with orphans, whether avian or mammalian, there are many important generalities regarding their care. These generalities will be discussed in this section before proceeding on to specific species needs. The five golden rules of orphan care are: DRY, CLEAN, WARM, QUIET, and WELL-FED. These points are applicable to all species and cannot be overemphasized. Other aspects such as handling and housing are also important. It must always be remembered that you are dealing with wild animals and their diet, housing and handling should be appropriate. The goal of wildlife rehabilitation is to return a well-adjusted, healthy animal back to the wild where it belongs.

When presented with an orphan, a thorough physical exam from head to tail is mandatory. Look for injuries, external parasites, signs of dehydration, shock, and malnourishment. It is also imperative to get an initial weight. Daily weight recordings are an important monitor of the baby's progress and alert you to trouble. However, it is normal for most babies to lose some weight during weaning since this is a stressful, transitional period.

As a veterinarian, your assistance is aimed at: 1) reversing life-threatening conditions, 2) diagnosing and treating injuries or disease, 3) beginning a proper nutrition and feeding schedule, and 4) determining long-term outcome. The rest of the introduction will discuss basic generalities of wild mammal care.

If planning to keep an orphan from beginning through release, it is wise to raise two or more of the same species and approximate age together. This will greatly facilitate species

recognition, proper play and feeding behavior and adaptation to life in the wild.

A common presentation to the rehabilitator is a hypothermic baby. This is a life threatening condition and must be corrected. Methods for warming the baby include:

1) immersing in warm 112-115°F water-don't overdo and dry off completely afterwards. Towel dry mammals and blow dry birds with warm air.

2) place in small container with hot water bottle

3) well insulated heating pads

4) incubator

5) infrared lamps

It is important to raise the body temperature to normal before feeding is initiated.

It should be assumed that some degree of dehydration is present in all orphan babies brought to you. The signs of dehydration are the same as in other small animals (i.e. dogs, cats). This can be corrected with subcutaneous, intravenous, oral, or intraperitoneal fluids. It is necessary to supply maintenance as well as replacement fluids to patients with moderate to severe dehydration. Lactated Ringers Solution is the preferred fluid in most cases. In cases of anorexia with vomiting (alkalosis) choosing Saline or Ringers + KCl (20 mEq/L) is the best choice. Ringers or Saline should also be used in cases of severe anemia with compensatory hyperventilation (mildly alkalotic). With mammal orphans that appear normal or slightly dehydrated, an oral (electrolyte) rehydrating formula such as Pedialyte, Lactated Ringers Solution, Gatorade, boiled Coca-Cola, or a homemade rehydrating solution (1 quart warm water, 3 tsp. sugar, and 1 tsp. table salt), should be used for the first 2-3 feedings at 10-20 ml/kg. The normal formula should be diluted to 25% concentration for next few feedings, followed by dilution of 50% concentration, then 75% concentration and finally full formula within 24-48 hours. This will allow time for an inactive gastrointestinal tract to become functional again especially in the cases of malnourished or starved animals.

Another common presentation is a parasite infested baby. These must be removed. Remove as many as possible manually and then apply an insecticide which is labeled safe for use on kittens.

There are many general feeding recommendations for orphan mammals. Some rules of thumb include, make only enough formula

for one day at a time and heat up only the amount that will be used per feeding. Refrigerate the rest of formula between feedings. Throw away all unused formula at the end of the day and keep all feeding utensils scrupulously clean. Sanitation is very important, therefore, washing hands prior to feeding, cleaning spilled food from the baby after feeding, and soaking utensils in Nolvasan are a necessity. Warm formula temperature to body temperature and feed slowly or at baby's own speed to avoid aspiration. The baby must feel secure so hold it firmly but gently. Do not overfeed. When the baby stops eating on its own, discontinue feeding. Overfeeding can cause diarrhea. Another important point is that all mammal infants with closed eyes must be manually stimulated to urinate and defecate. This should be done after every feeding with a soft towel, tissue, cottonball or Q-tip moistened with warm water. Babies should be weighed daily and the information recorded as a way of monitoring their progress.

Other generalities include criteria for outside caging. These include:

1) protection from harsh elements

2) proper air circulation

3) private nest area with suitable nesting material

4) natural accessories such as branches, logs, sod, etc.

5) design that allows easy and frequent cleaning.

Criteria for release and release areas must also be considered. Before an animal is suitable for release it must be:

1) acclimated to outdoor living

2) accustomed to natural foods and know how and where to find it

3) physically fit and well conditioned

4) wary of humans

A release area should include:

1) natural habitat with others of same species present

2) abundance of natural foods

3) water source

4) absence of humans and pets

This introduction has hopefully given you some basic information on how to start a successful wildlife rehabilitation program. Once the decision to undertake the care of an orphan animal has been made it is your responsibility to do what is best for that individual. With basic knowledge, useful hints, and a lot of caring you will be able to help many needy animals.

COTTONTAIL RABBITS

Age Determination

birth:	naked, eyes closed, ears flat against head, are 3-4" long when stretched out and weight close to one ounce (28-30 grams).
1 week:	full hair coat.
6-10 days:	eyes open.
2 weeks:	begin to leave the nest and nibble on solid food.
3-4 weeks:	on their own - should be 4 or more inches long from tip of the nose to the tail in a hunched up sitting position.

Nutrition/Feeding Schedule

There are many formulas which have been used in raising baby rabbits. It should be understood that raising baby rabbits successfully is an extremely rare occurrence. Diarrhea is a major problem and can be caused by too concentrated a formula or bacterial overgrowth within the baby rabbit's normally sterile gut. It is recommended that if diarrhea occurs to dilute the concentration of the formula until the diarrhea clears up. Introducing solid food as soon as their eyes open is another important step to take in increasing their chances of survival. The sooner they wean from formula, the fewer problems that should develop. A recommended procedure to help keep a baby rabbit's gut sterile and thereby prevent diarrhea is to administer an antibiotic in the formula. This is done by adding Bactrim (Roche) BID for 5-7 days at a dosage rate of .02 ml per 50 grams of body weight. This is started the first day the babies are received.

Formula #1: This combination matches up best with the actual composition of cottontail rabbit milk. 3 parts multimilk to 1 part KMR diluted 1.5:1 with water. This formula can often be too concentrated resulting in diarrhea. Therefore, if this occurs, mix a 1:1 powder combination to water dilution.

Formula #2: This is a homemade formula that many rehabbers have had success in using. 1 cup half and half, 1 large egg yolk, and 1-2 tsp. Karo syrup. In this case, egg yolk tends to harden the stool while Karo syrup tends to loosen it. Therefore, these two ingredients can be changed till stool is of desired firmness.

Formula #3: 1 part powdered Esbilac, 1 part whipping cream, and 3 parts water.
*Avoid high sugar diets as they result in juvenile cataracts.

To initiate feeding, place a drop of formula on the rabbit's lips. They will lick it off and begin nursing. This may need to be repeated in order for nursing to start. If the baby is slow to nurse, maintain its hydration by administering subcutaneous fluids. Feed rabbits with closed eyes 3-4 times per day. Rabbits should be fed in their normal sitting positions. Use a 1 cc or 3 cc syringe to feed. Gradually decrease the number of feedings as the babies get older. By the time their eyes are open, one or two feedings are all that is necessary. This is also the time to begin offering solid food, such as natural grasses, dandelions, clover, alfalfa hay, rabbit pellets, and apples, etc. The amount of formula to feed is often difficult to determine. This will usually be decided by the individual baby. Rabbits with their eyes closed should eat about 2 cc of formula per feeding but this is quite variable and this will increase with age. Daily weighing will indicate whether the rabbit is eating enough. Weaning weights will vary from 70-140 grams. Offer weaning rabbits a wide range of fresh plants daily.

Proper Housing/Management

Housing can be very simple for young rabbits that are still nursing. A cardboard box with high sides, a small rodent cage, an aquarium, or incubator can all be used effectively. It is important to provide supplementary warmth until rabbits are fully furred, have open eyes and are beginning to eat on their own. Temperatures within the nest area should be between 80-85°F. Humidity can be supplied by a damp sponge placed in an open jar. A small nest box should also be provided for extra security. This can be a cardboard box filled with Kleenex, paper towels or any other soft, ravel-free material. As the rabbits begin to wean, move them to an outdoor cage with a nest box set in a quiet spot protected from weather, predators, pets and children. This allows them to become

acclimated to the outdoors. Use a fine wire such as 1/4" mesh. Cage should be double wired for extra protection, and be as large as possible.

Wild rabbits throughout their stay with a rehabilitator should be kept in as quiet and stress-free an environment as possible. Under no circumstances should they be accustomed to being exposed to the family pets or any other known predator. Human contact should be kept to a minimum. It is also advised to raise two or more bunnies together.

Handling

Handling must be kept to a minimum when dealing with rabbits. Hold the baby firmly but gently so that it feels secure. Rabbits have a tendency to jump suddenly and quickly so be prepared.

Common Problems

Diarrhea, stress, and fractures are the most commonly seen problems. The causes and

prevention of diarrhea were discussed earlier. If diarrhea becomes a problem, subcutaneous fluids, and/or diluting the formula should be done in order to maintain hydration. A small dose, 1 cc/lb., of Kaopectate can be used to try to control the diarrhea. Stress can be prevented by providing a quiet, calm environment. Fractures can also be avoided by careful handling, safe housing and preventing disturbances from occurring. Rabbits have a light skeleton and powerful muscles which results easily in fractures. The lumbosacral area is the most prone to fractures. Fractures, if they do occur, are not very amendable to treatment due to the disposition of the animal.

Release

Rabbits are ready to be released once they are 4-5 weeks old, eating on their own, are shy and frightened of humans and other animals and are healthy. A meadow or field that has proper brush cover is the ideal spot for release. The best time for release is during the late afternoon when rabbits are becoming most active. (See release site considerations in the introduction.)

SQUIRRELS

Unlike rabbits, squirrels are very hardy and relatively easy to raise.

Age Determination

birth:	Baby squirrels are normally born in mid March and July. Birth weights range between 14-18 grams. They are born naked, blind, deaf, and have no teeth, but their claws are well developed and vibrissae are present on chin and nose. Squirrels develop slowly when compared to other rodents.
8-10 days:	Fox squirrels develop fur along their back (gray squirrels about day 14).
3 weeks:	lower incisors erupt.
4-5 weeks:	eyes open.
5 weeks:	upper incisors erupt.
6 weeks:	ears open.
8-9 weeks:	weaned in wild.
12 weeks:	on their own.

Nutrition/Feeding Schedule

The first 2-3 feedings should be an oral electrolyte solution as mentioned in the introduction.

Formula #1: Esbilac mixed 1 part powder to 2 parts water. If diarrhea becomes a problem, dilute formula with 3 parts

water.

Formula #2: 1 part powdered Esbilac to 1 part powder multimilk. Then mix 1 part powder combination with 2 parts water.

Formula #3: KMR mixed 1 part powder to 2 parts

Feeding Regimen (Stone and Fender, 1985):

Age	Amount	Frequency	Night Feeding
birth-1wk.	1/2-2 cc's	every 2 hrs.	one (after 11 pm)
1-2 weeks	2-4 cc's	every 2 hrs.	maybe
2-3 weeks	4-6 cc's	every 3 hrs.	no
3-4 weeks	8-10 cc's	every 3-4 hrs.	no
4-6 weeks	10-15 cc's	every 4 hrs.	no
6-8 weeks	15-18 cc's	every 6-8 hrs.	no

water.

This feeding regimen will vary slightly with each individual. Feed babies with a 1 cc or 3 cc syringe. A small pet nurser can also be used. Squirrels are enthusiastic eaters so be careful that the nipple opening is not too large. Solid foods should be introduced when the eyes open. A commercially prepared rodent chow should be fed as 80-90% of the diet. Fruits, vegetables and other natural food items make up the rest of the diet. Feed the rodent chow in the morning and the other food at night to insure a well balanced diet. Metabolic bone disease is a common occurrence in baby squirrels fed a diet of inadequate calcium: phosphorus ratio. Supplementary foods include broccoli, carrots, corn on the cob, apples, bananas, fruit tree leaves, assorted nuts (raw and unsalted), and high quality dry dog food and cat food can also be given. Natural food of squirrels include: nuts, soybeans, corn, berries, fruit, buds, seeds, bark, insects, eggs and baby birds. As release time approaches, increase the amount and kind of natural foods the squirrels will find in their area. Also, hide the food within their cage so they learn to search for food. Lab animal water bottles can be used as they cause less mess and are more sanitary. A rodent mineral block should also be provided.

Proper Housing/Management

As with rabbits, young squirrels with closed eyes can be housed in the same simple containers with the same heat sources. At five weeks, squirrels can be housed within a small cage. Their previous nest box should be placed in the cage as added security. Branches must be added for exercise and playing. Part of the cage should receive supplemental heat to ease the transition and in case they need it. As they grow and become stronger, they can be moved to an outside pen (minimum requirements for juveniles are 4'x6'x4') for a few hours during the day. Protection from the elements and predators is

mandatory. The squirrels must not be exposed to cats and dogs in a favorable manner, they must develop a natural fear for all possible predators. As they reach 8 weeks of age, they can be moved to an outside cage permanently. There should be a nest box as well as many branches and other hiding places available. A pan of clean soil and leaves should be placed within the cage to stimulate digging and caching behavior. As with other wild animals, it is best for the animals involved to be raised in a group.

Handling

Baby squirrels should be fed in a belly down position. They need to be held securely but gently. Baby animals need affection so during the period of formula feeding, this can be given freely. Once the weaning process begins, gradually decrease the time spent with them. When the squirrels are weaned, they should have as little contact as possible with the rehabilitator in order to develop a normal wariness of humans.

Common Problems

Aspiration of formula can occur quite easily in baby squirrels if the nipple opening is too large. They are normally very eager eaters and still suck greedily on their bottles. By feeding slowly with a syringe or using a nipple with an appropriate size opening, this can be avoided. If formula appears in the nose, aspiration can easily occur secondary to this. The nose must be blotted to make the baby sneeze the rest out. Hold the baby upside down for a few seconds to remove more formula from the airways. If more is present, use a small bulb syringe and remove milk gently from the nose, and repeat till gone.

Genital suckling can be a major problem among baby squirrels. Watch the male squirrels for signs of swelling or blockage. If blocked, soak the penis with a warm, moist cloth to soften the crust. Pull off crust so that the opening is clear.

Apply Panalog ointment to prevent crust from reforming and to reduce swelling and inflammation. If this occurs, it is necessary to separate the littermates temporarily. This behavior is thought to be a result of insufficient formula per feeding or an inadequate number of feedings.

Diarrhea can occur because of overfeeding or a sudden change in formula or diet. Fruits such as oranges, pears and grapes should be fed in limited amounts as they tend to cause diarrhea. Parasites, incorrect formula and dirty feeding instruments can also predispose to watery diarrhea. If diarrhea is greenish to almost white, this can indicate an enteritis due to bacteria, dietary problems or a pathologic condition. Dark stools may be a sign of internal bleeding due to trauma. Diarrhea may be controlled by substituting rehydration solution for the next 2 feedings, and then gradually reintroducing the formula. Kaopectate can also be used at a rate of 1 cc/lb. Constipation may be a side effect.

Paralysis can occur as a result of vitamin B deficiency. Treat these squirrels with IM injections of Vitamin B Complex at a dosage rate of 0.002-0.02 ml/100 grams of body weight until the problem is resolved.

Release

Prime age for release is 12 weeks of age with a weight of at least 350 grams. They should be fully acclimated to outdoor weather, eating natural foods and be frightened of people and pets. Another pre-release test is the ability to crack a walnut in the shell.

Since squirrels are territorial, the abundance of resident squirrels in an area is an important consideration. It is best to release

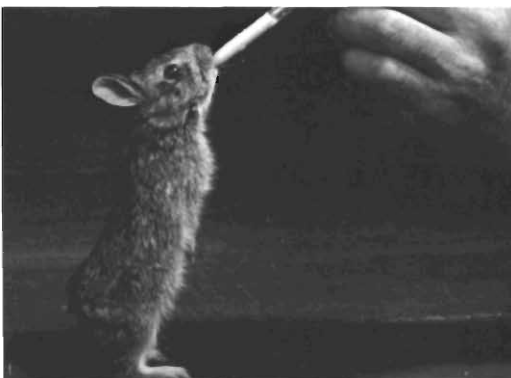
squirrels during the daytime since they are a diurnal species. Release site qualifications should be thoroughly checked out before release time. (See pre-release considerations in the introduction.)

Again, the editor would like to reiterate that information presented in this article should be tailored to the individual situation, and veterinary consultation is advised.

*Watch for the second segment of "How to Care for Orphaned Wild Mammals" in the Spring 1992 issue of the ISU Veterinarian. Topics will include the care of opossums, white tailed deer, and raccoons.

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