

# California Ground Squirrel Rehabilitation



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## **California Ground Squirrel Rehabilitation**

Rehabilitating ground squirrels is very similar to rehabilitating tree squirrels except the caging needs and release are quite different. Their diets are only slightly different. Very young infant ground squirrels are rarely encountered due to the fact that the nesting chamber is deep inside the burrow. The only time very young babies are found is during deeper ground excavation for construction or landscaping. Orphans will generally only be found above ground after their eyes have opened and they can crawl out of the burrow if mom has died and they are hungry. When they first emerge from the burrow and venture out on their own is when they get into the most trouble with cats, dogs, hawks and cars. After the first wave of orphaned babies you will then get a wave of injured juveniles that have generally been brought in by the cat or dog.

### **Description**

California Ground Squirrels (*Spermophilus Beecheyi*) are one of a few native ground squirrels in California. They are found as far North as Washington and as far South as Mexico. They are about 14-21 inches long (36-51 cm) and weigh about 10-26 oz. (280-740 gm). They are mainly brown with paler dapples. They have a pale V-shaped area of fur at the neck running over each shoulder that looks like a white spotted stole. In the wild they generally live about three years but in captivity can live up to ten years.



### **Habitat**

They are found in low elevations on our coastal beaches, mid-elevation in local city parks and in high elevation mountain and field areas. They will always be located very close to the food source be it natural foods, crops or tourist handouts. They generally never stray more than 75-100 ft. away from their burrows so they can always have a safe burrow to hide in from predators. Where there are large colonies of ground squirrels you will also find their natural predators which are coyotes, hawks, snakes, weasels and foxes.

## **Burrows**

They are not as social as most ground squirrels so they can live alone or in informal colonies. When in colonies, each member has its own entrance to the colonial burrow underground. When a predator approaches each squirrel scurries to its own entrance rather than use another squirrel's entrance that might be nearer. Their burrow includes two entrances/exits, a hibernation chamber, summer sleeping chamber, nesting chamber, food cache chamber and sometimes an elimination chamber. They prefer to build their burrows in softer ground on an incline. When they build their burrow next to the ocean, they can plug the entrance and exit holes during high tide to prevent their burrow from being flooded. They also plug their burrow holes during winter hibernation.

## **Breeding**

CGS generally breed once per year soon after they emerge from hibernation. The older females breed earlier than the younger females so you may see two waves of young. Sometimes they will breed twice a year if their hibernation period is short or nonexistent. The gestation period is approximately 30 days and they usually have 6-8 babies per litter. As CGS at lower elevation generally emerge earlier from hibernation, they will have litters 30 days after emergence which can be from April to May. The second wave will be seen from June to July.

## **Development**

Birth: Hairless, pink with barely noticeable whiskers, blind, no eye slit, ears tightly closed, weight 5-8 gm, can crawl slightly and squeak.

Day 3: Pigment begins to appear, starting at the head and progressing down the back.

Day 7: Well pigmented, short fur begins to grow, more active.

Day 14: Lower incisors erupt

Day 17: Well furred, more coordinated crawling, upper incisors emerge

4 weeks: Eyes open. Weight about 40-45 grams.

6-10 weeks: Begin to emerge from burrow. Females will nurse young for 7-8 weeks. Almost a week after emerging from the burrow they can forage on their own. Weight about 90 grams.

14-18 weeks: About 90% of their full size.

## **Natural diet**

CGS at different elevations and in different habitats will have different diets. When located on beaches they will survive mainly on tourist handouts along with seaweed, natural grasses, carrion, grains and seeds. When located in more natural surroundings their diet will consist of nuts, seeds, grains, berries, fruits, roots, green vegetation, cactus, carrion, eggs and insects.

## **Diet in rehabilitation**

Infant: The infant CGS diet is similar to the infant tree squirrel diet. A variety of formulas may be used including Esbilac, Fox Valley and Zoologic Milk Matrix mixed as instructed.

Weaning: Add powdered rodent blocks or high protein baby cereal to formula soon after their eyes open. Small amounts of soft fruits and vegetables, small pieces of rodent block and grains may also be offered.

Post-weaning: Rodent blocks and Zupreem monkey chow biscuits can be used as the staple diet to insure proper nutrition. 30% of the remaining diet may be fruits, vegetables, grains, seeds, berries and some nuts. CGS love broccoli. They may also be offered crickets, grasshoppers, mealworms and small bits of meat prior to release. I give them small bits of cooked chicken.

Wild adults: They may not be interested in rodent blocks or monkey chow. Offer them the natural diet with a vitamin mineral powder or liquid mixed into the food or water. If they cannot chew, you can offer them Ensure pecan flavor, applesauce mixed with Nutrical, powdered rodent blocks/chow mixed with water given through a syringe.

Below is a chart comparing different formulas and milks.

Type of milk	Solids	Fat	Protein	Carbohydrates	Kcal/cc
Eastern gray					
Ben Shaul	28	13	9	3	1.64
Jeness & Sloan	40	25	7	4	2.67
Nixon & Harper	25	12	9	3	1.57
Milk 3.3% fat	12	3	3	5	0.61
Goats milk, fresh	13	4	4	5	0.7
Evap. milk can	12	4	4	5	1.06
KMR liquid	18	5	8	5	0.8
Esbilac 1:2	15	7	5	2	0.9
Esbilac 1:1	30	14	10	4	1.8

### **Dehydration and fluid therapy**

Always allow a newly arrived squirrel to reach a normal body temperature before giving any fluids or food. The squirrels organs cannot process food or fluids until they are warmed. If food or fluids are given to a very cold squirrel, they will not have the energy to process it and may die.

Assume all squirrels are dehydrated upon arrival. These are some signs of dehydration: pale, grayish gums, dry mouth, sunken eyes, whites around eyes showing, rough, spiky fur, dry scaly skin.

Some rehabbers use the "tent test" to check for dehydration. Gently pinch a small amount of skin between two fingers to form a tent. If the skin quickly goes back down, the squirrel is hydrated. If the "tent" is still evident after a second or two, the squirrel is dehydrated. This is not always reliable with baby squirrels because they go through a wrinkly stage where they look like Sharpei puppies. Be sure to look at all indicators and don't rely on any one indicator to test for dehydration.

Oral administration of fluids is the easiest and fastest way to re-hydrate. Subcutaneous (Subq) injections of fluids should generally only be done if the animal is unable to swallow. Subq can cause additional stress to an already stressed animal. Legally you must consult a veterinarian for guidelines on the amounts of fluids to be injected and the frequency. You can introduce fluids orally even in an unconscious squirrel with proper technique. Place one drop at a time on the tongue of the squirrel and wait for the swallow reflex action.

I personally believe the best hydrating fluid to give to a warmed baby is Lactated Ringer's Solution for the first few feedings. You can get Ringers from your local veterinarian. Pedialyte, Gatorade and other over the counter hydrating solutions can have too much sugar or dextrose which will actually cause more dehydration. Do not use a solution with more than 2.5% dextrose for initial hydration. You can use these fluids for hydration maintenance after they are fully hydrated. Make sure all hydrating fluids and formulas are first warmed so they feel warm to the touch but never hot, about 100-102 deg. F.

### **Introduction of formula**

A baby should never instantly be fed full strength formula. This can cause digestive problems because it is not exactly the same as mothers milk or the baby may not have eaten in quite a while and not yet able to process foods. After he is warmed and hydrated you should slowly introduce formula mixed with the hydrating formula over a days time gradually increasing the ratio of formula to hydrating solution until the baby is on full formula. I suggest the following ratios for a warm and hydrated baby.

- Feeding 1 100% hydrating fluid
- Feeding 2 75% hydrating fluid 25% formula
- Feeding 3 50% hydrating fluid 50% formula
- Feeding 4 25% hydrating fluid 75% formula
- Feeding 5 100% formula

If the squirrel develops bloat, diarrhea or constipation, go back to hydrating fluid only then slowly try to introduce the formula again, this time more gradually. The stools when feeding Esbilac formula should be golden-yellow, firm and well formed. If they become whiter or loose, cut back on the amount of formula until the stools are well formed again. If the baby has diarrhea for over 24 hours, consult a veterinarian. Initially the stools of a baby may be dark which is the normal stool color if fed mothers milk or the goats milk recipe.

### **Feeding instruments**

You can use an oral syringe (without a needle) to give fluids orally to a squirrel. I suggest a 1/2 cc syringe for pinkies (with or without a nipple depending upon your preference and the squirrels), 1 cc syringe for squirrels 2-5 weeks of age and 3 cc syringe for all other squirrels for initial hydrating purposes. You can use up to a 5 cc syringe to feed larger older babies. I do not recommend any larger as it's easy to aspirate babies especially with larger syringes if they're real hard sucklers. It's better to fill up a few 3 cc syringes at a time then one 5 cc or larger syringe.

If using a nipple, I suggest the catac nipple. If feeding a very small newborn pinkie squirrel, one can use a tom cat catheter or super glue attachment nozzle attached to the end of the syringe to control the amount of formula better. I do not suggest using pet nursers/bottles because it's more difficult to control the amount of formula. Everyone should use what works best for them and their squirrels. See appendix for where to find these supplies. Below are photos of various feeding instruments.



### **Feeding technique**

While holding the baby upright but leaning slightly forward with the oral syringe angled slightly upward and forward to form a 90 degree angle with the baby, you can place the tip of the oral syringe right to the babies lips then gently and slowly squeeze one drop for them to taste. (Photo below) When babies are 4 weeks of age and older they may prefer to lie prone on their stomachs while grasping the syringe in their paws. They may start to make suckling, licking or lapping motions with their mouths and tongue then you can slowly squeeze out more drops of fluid. Do not squeeze out a regular stream, instead squeeze a tiny bit then allow them to swallow that amount before squeezing more. With pinkies I go drop by drop because they are so easy to aspirate, i.e. to take fluids into the lungs by suction. If they become aspirated, they can die of pneumonia without proper treatment. Proper treatment is the use of antibiotics, generally Clavamox liquid. With older babies I will squeeze fluid slowly for one second, let them swallow that, then squeeze more. If fluids dribble out the mouth or come out the nose, you are going too fast. If fluids come out the nose, stop feeding immediately, hold them upside down for a few seconds, blot their nose with dry tissue paper then let them wait a few minutes before resuming feeding.

If the baby does not immediately suck, lick or lap the fluid, you can gently place the tip of the syringe into their mouth. It's sometimes easier to enter from the side of the mouth especially if they already have teeth. Then gently squeeze out a drop of fluid into their mouth for them to taste. It sometimes takes a feeding or two for them to catch onto the new feeding method.



### **Feeding amount and frequency**

The following chart should be used as a guide for feeding baby squirrels. A good rule of thumb for maximum

volume amount to feed per feeding session is 5% of the squirrel's body weight in grams (Sedgwick et al. 1988). This is approximate maximum stomach capacity. One half to 3/4 of the maximum is a safe amount to feed. Be sure to weigh your squirrel frequently to be able to adjust the amount of food needed and make sure that it is gaining weight.

<b>Age</b>	<b># daily feedings</b>	<b>Frequency</b>	<b>Type</b>
0-2 weeks	6-8	2-2.5 hrs + 1 at night	Formula
3-4 weeks	6	3-4 hrs + 1 at night opt.	Formula
4-5 weeks	4	4-5 hrs no night	Formula and food
5-6 weeks	3	4-5 hrs no night	Formula and food

Besides maximum stomach capacity you need to consider their total daily caloric needs. One way to figure this out is by using the Minimum Energy Cost (MEC) formula which is  $K \times W$  (in Kg) to the .075 power, where K is kilocalories utilized in one day by a hypothetical 1 kg specimen. Squirrels are considered placental mammals and their K factor is 70. All of this is multiplied by a factor to get their total daily caloric needs. A growing baby squirrel has a Base Metabolic Rate (BMR) of 3, sometimes 4. If they are injured or overcoming illness it will probably be 4. As this is a basic class, no need to pay attention to the math. In the back of this manual are charts which figure everything out for you based on the weight of the baby using Esbilac formula mixed 1:2 and 1:1. As you can see Esbilac mixed 1:2 with water by itself does not have as many calories per cc as squirrel mothers milk. You would have to feed almost twice as many times a day as the schedule above. Mixed 1:1 feeding the baby the maximum stomach capacity will make the number of feedings be more in line with the chart above. I don't suggest this as it may be too rich and may not provide enough fluid. This is why some people like to add whipping cream, rodent block dust and other things to the basic formula. All of these numbers, charts, recipes are merely guidelines. If your baby is urinating, defecating and growing normally, you are feeding him properly.

For proper development squirrels need the proper Calcium to Phosphorus ratio. It must be 2:1 for infants, 1:1 for adults. If the baby does not get enough calcium or not in the proper ratio, they can develop Metabolic Bone Disease (MBD). It's easy to add the necessary Calcium by grinding up Calcium tablets into dust and adding it to their food.

As soon as their eyes open and they're moving around at 5-6 weeks or so I introduce 1/2 inch square pieces of soft food such as avocado, apples and grapes. If you give them grapes, you must peel it for the little babies or the skin will get stuck in their throat and they'll gag. If you get big Globe grapes, they're real easy to peel and cheaper.

They will generally just chew on and play with their food in the beginning which is fine. If they are having a problem adjusting to regular foods you can slowly add apple sauce, pulverized rodent blocks or baby cereal to their formula to make it thicker. If using the rodent blocks, put them in a coffee grinder to turn it into dust so it doesn't stick in a syringe.

When they are around 6-7 weeks of age I start to introduce harder foods such as bits of carrot and small pieces of rodent blocks. I will also give them some shelled almonds so they can learn how to chew on things. They will generally just chew some of the food up and not eat it which is fine. When the formula feedings decrease, I increase the amount of soft and harder foods until they are totally weaned around 10 weeks or so. Then I give them breakfast and dinner of hard and soft foods. Get them used to normal squirrel feeding times by feeding them within a couple of hours after sun up and within a couple of hours before sun down. Some squirrels may refuse formula at 6-7 weeks of age, some will still beg for it at 10 weeks of age which is within the realm of normal.

Below is a list of some acceptable foods for squirrels. As with everything be sure to introduce new foods gradually. Some squirrels can get bloody diarrhea if they eat an entire walnut for the first time while others can get green soft stool from eating too much avocado. I always try to make sure that there is a little food left over so I know that they're all eating enough. Use nuts and seeds as treats only or they will get fat.

Fruits and veggies: grapes, cherries, apple, melon, tomato, avocado, butternut squash, orange, broccoli, endive, turnip greens, cucumber, okra, green bell pepper, raw corn on the cob, pear, green bean, sugar pea, sweet potato, spinach, mustard greens, carrot, carrot tops, raw soy bean, plum, banana, kiwi, mango, strawberry, strawberry tops, buck eye, blueberry, blackberry, raisin, fig, date, peach, nectarine, apricot to name a few. Nuts and seeds: pine nuts, acorns, pine cones, sunflower seeds, peanuts, walnuts, pecans, hazelnuts; sun dried watermelon, cantaloupe, squash and pumpkin seeds. They also like fresh rosemary, fresh lavender and rose petal clippings. Ground squirrels getting ready for release and adults also like a tiny bit of cooked chicken.

### **Feeding tips and tricks**

- Mix the powdered formulas with a fork and not a blender. The blender will get too many bubbles in the formula.
- Mix only the amount you will use that day. Warm only the amount you will feed that feeding session.
- Always make sure your hands are warm before handling babies.
- If the plunger of the syringe should stick, use a tiny bit of olive or mineral oil to keep it moving smoothly.
- Always clean the syringe out with hot water after each use to sterilize. I also use a pipe cleaner to clean out the hole if any formula accumulates. Let the syringe dry with the plunger out to make sure the syringe dries completely.
- When babies are eating solid foods and drinking from water bowls, use thick glass or ceramic ashtrays or crockery. Do not use plastic dishes which they will chew up.
- When feeding large numbers of babies, you can place the formula in a coffee cup on a heating cup warmer. Just be sure to keep babies away from the warmer.
- To keep track of large numbers of babies, after feeding and stimulating each baby, place it into a new container so you can be sure to feed all babies without feeding some babies twice.
- I like to put the baby on a piece of fake fur to feed so it feels more natural. I also put a little fabric under the middle of the fake fur piece so it will feel more like the natural nursing position if he were nursing on his mother. They feed similar to kittens with mom rolling over half on her back. It also makes it easier to get the syringe to his mouth properly.
- If you are feeding a lot of babies, try not to hunch down and over. Raise the feeding platform if necessary or you will get a bad neck ache.
- Learn how to refill a syringe with just one hand so you can always have one hand on the baby. Never leave a baby unattended, even for a second. They can roll or crawl off the table just like human babies.

### **Urination and defecation**

Always stimulate baby squirrels after each feeding. Some may require stimulation before feeding. If a squirrel stops eating in the middle of feeding, it may need to be stimulated before continuing to feed. Use a warm, damp cotton ball, tissue or q-tip and gently pat the genitals until urine or stool is produced. You can use a slight downward stroke above their genitals to help them produce urine. You can gently press directly around the anus to help them produce stool. Be sure they are urinating and defecating at least every other feeding. Initially they may not produce much urine if they are dehydrated. They may not produce much stool if they were not fed for a



while. Don't be alarmed if they do not produce stool the first day if they were separated from their mother for a while. Generally babies will urinate and defecate on their own soon after their eyes open. If baby does not, continue to stimulate.

### **Body part suckling**

It's fairly common for baby squirrels to suck on the penises, vulvas, heels, knees, elbows, noses, stomachs of their litter mates. The urge to suckle is very strong. In nature mother squirrel probably lets them suckle longer than we nurse them. If you see red and inflamed body parts, they are probably suckling each other. Try to feed them more often, more slowly and longer to satisfy their natural suckling instinct. If they are older, give them some harder foods to chew and suck on. If it's just one baby which is doing all the suckling, remove that squirrel to another area. If he is suckling himself, treat his penis with petroleum jelly or neosporin. You can also spray some bitter apple on his penis which may reduce the suckling. Extreme cases of suckling may result in scabbing and blockage of the urethra. If the scab blocks the flow of urine, it must be removed. This can be accomplished by soaking the scab for 15-20 minutes with a wet cotton ball until the scab turns white and slides off easily. If the penis is just very swollen, an antibiotic ointment containing steroids such as Panalog or Animax will help reduce the swelling, so will preparation H. If the baby still cannot urinate after trying these suggestions, consult your local veterinarian for other solutions.

### **Housing**

Infants may be kept in a pet carrier, aquarium, terrarium or small wire mesh cage with a heating pad set on low under half. Give them soft fabric with no holes or string in which to nest. An incubator set at 90 deg. F with 70-80% humidity is even better for very young infants. You can use a stick-on reptile thermometer in the incubator. An incubator can be made out of a 10-20 gallon Tupperware container with ample holes in the lid or a hold cut out of the lid with wire mesh inserted so they cannot escape. Drape a towel over the container to simulate the natural darkness of a burrow.

As soon as their eyes are open and they can crawl around you can transfer them to a larger cage about 2' square. You can place this cage into a deep metal pan so that you can fill the bottom with dirt, or you can just use shredded newspaper and fabric. If you do not have a deep pan, just be sure that you provide them with a nest box and tubes to use as an artificial burrow. You can use paper towel tubes for young babies, wider PVC and plastic tubes for older squirrels. Pet safe ones at the pet store are safer than ones in the plumbing department of your local hardware store. As soon as they are weaned they can go to a larger outdoor cage 4'x4'x6' so they can get ready for release. Continue to provide them with a wheel, probably a larger one as they grow. Some people bury the lower two feet of the cage into the ground so they can dig in natural dirt and build a natural burrow.

Infant squirrels of the same age from different litters may be raised together. Groups of no more than eight can be raised together. You should never raise a solo squirrel as they need to learn how to socialize, play and can bond too strongly to their caretaker. Call around and find someone with other squirrels of a similar age for companionship.

Injured adults should initially be housed in small wire mesh cage with a smooth floor or a pet carrier with a metal door that is also reinforced with wire mesh inside. CGS can chew out of a plastic carrier in about 20 minutes. If you must treat the squirrel daily, just give it lots of soft fabric to make a nest. If you don't have to treat it anymore, give it a nest box with a tube to hide in. Removing an adult ground squirrel from its nest box can be dangerous because they will bite. That's why it's easier just to grab them with the fabric nesting material to hold

and treat them. Bite proof gloves are a good idea but you will still get a bad bruise from the force of their jaws on your finger. They can also get through some bite proof gloves so do not rely on the gloves. Rely on proper holding techniques as discussed later.

Keep your caging away from the sight and sound of humans and pets so they do not become too accustomed. Limit handling of the squirrels to the bare minimum for feeding and examination only. Do not talk to your squirrels. You do not want them to become bonded with you, the caretaker. You do not want them to seek out human contact when they are released. If they come up to a human after release and that human thinks the squirrel is trying to attack them, they may kill the squirrel.

Minimum Fish & Game requirements for ground and rock squirrels as per minimum standards third edition 2000 are below. CGS are not regulated by Fish & Game so these are just guidelines. If the squirrel is injured, you can confine them in a smaller cage or carrier to limit mobility so they will not injure themselves.

<b>Infant care</b>	<b>Nursing/preweaned</b>	<b>Juvie or adult outside</b>	<b>Init. injured adult inside</b>
(Litter) 10-Gallon	(Litter) 20 Gallon	(L) 4'wide x6'long x6' tall	(1) 2'wide x2'long x2' tall

## **Release**

Ground squirrels that do not hibernate may be released at any time providing that there will be a couple of days of good weather so they can find, renovate or build a burrow. Ground squirrels that hibernate must be released well before their hibernation so they can gain weight, cache food and prepare their hibernation burrow. Higher elevation CGS should be released at the latest by August 1, lower elevation by September 1 if they hibernate.

CGS are regulated by the Department of Agriculture. They are legally considered agricultural pests. CGS cannot be relocated without a permit. They must be released back where found. Release them on the edge of the colony where found. CGS are not as social as most ground squirrels but they may not immediately accept an outsider. They have scent glands on the side of their face. When they greet each other they smell each other and can tell how related they are to each other. They are more receptive to a squirrel more closely related to them.

If you cannot release the squirrel in sufficient time before hibernation, you will have to hold him over the winter. Put the squirrel in a dark covered cage with a nest box. Provide with food and water but you will probably only see them eat every few days. They will sometimes even go to sleep with food in their pouches so they can eat without having to get up. They will not truly hibernate indoors but will seem to stay in a state of deep sleep for days at a time.

Release the squirrel after other squirrels have been seen above ground in its colony so the squirrel may have proper breeding opportunities.

There are a few ways to release ground squirrels. Some believe in tough love and just place a carrier on the ground in a protected area such as a bush on the edge of the colony. Then they wait for the squirrels to leave the carrier or they gently nudge them out. Sometimes they can become stressed and instantly take off running. If you are anywhere near cars, do not do this. Some will place them in a cardboard box with air holes and a door flap in the same place. This way they can leave when they choose and the box is biodegradable. Some build a burrow for them underground. Dig a hole approximately 1.5 ft. deep. Place a nest box or cardboard box with a front a rear hole into the ground. Get two large paper roll tubes with diameters at least 2 inches. Make sure the inside of the tubes is grippy enough so they can climb up the tubes at an angle. Place one tube in one hole and attach with

duct tape. Do the same with the other hole and tube. Bury the nest box and tubes leaving just the tube holes exposed. Place the squirrels into the tube and they will run down into their new burrow. They will use this as a temporary burrow until they find, renovate or build a new burrow. Some leave food in the nest box, some do not for fear of attracting predators.

## **Illness and Injury**

If the squirrel is ill or injured and able to at least crawl, he will generally crawl back to his burrow to die which is why we don't get in many ground squirrels as compared to tree squirrels. The most common illness and/or injury in juvenile and adult ground squirrels is being caught by a cat, dog, hawk or other predator. Second is being hit by a car, third is rat and ground squirrel poison. The most common ailments in baby ground squirrels are being aspirated by the rehabilitator while nursing, diarrhea from overfeeding or constipation from inadequate hydration.

Adult ground squirrels will generally try to bite. They can bite through leather and bite resistant gloves. Restrain the squirrel by wrapping tightly in a towel or soft cloth. Grip the head just behind the jaws with thumb and forefinger of one hand. This way they cannot whip around and bite you. Covering the eyes will make them feel more secure. Administer medication with oral syringe. After treatment return squirrel to its cage and then unwrap the body before releasing the head hold.

When first booking in a new animal provide care in the following order.

- 1. Treat life threatening wounds.** Apply pressure and wraps to stop bleeding and temporarily set injured limbs.
- 2. Warm.** If they are not warm, their organs will not be functioning properly and they will not be able to absorb or process fluids, medication, food and they can die of shock. After treating life threatening injuries, place them in a warm, dark, small cage in a quiet area so they can relax and feel more secure for 30 minutes to an hour.
- 3. Hydrate.** If they are not hydrated, they will not be able to absorb or process foods.
- 4. Begin to feed.** Introduce food to them slowly and gradually especially if they are extremely emaciated.
- 5. Treat secondary illness and injury.** After they are stabilized, treat secondary injuries and illness such as parasites, set broken bones properly and clean the squirrel if necessary. If you treat every ailment of the squirrel all at once, it may be too stressful.

Predator wounds: Clean and flush punctures and lacerations thoroughly using Povidone-iodine 10%. Flush with a monoject curved tip syringe. If wound is already infected, lance wound with scalpel or lancing instrument, press out pus then flush thoroughly with iodine. Leave at least a 1/4 inch hole for drainage. Administer antibiotics: baytril injectable solution 2.27%, oral amoxicillin or oral clavamox. Use amoxicillin for infants.

Road rash: If a squirrel is clipped by a car and thrown, he will have road rash. If it is severe, use lidocaine 10 mg/ml before cleaning wound. Flush wound with sterile saline then iodine to remove dirt and road debris. Administer antibiotics. Use triple antibiotic ointment with pain reliever on wound. If the eyes were also injured, use Terramycin ointment. Apply with a q-tip gently yet directly to eye.

Poisoning: Rat/ground squirrel poison. Administer Vitamin K and fluids. 2 mg/kg at least once or twice daily for at least four days.

Head trauma/spinal injury: The only real treatment is supportive care, confinement and small doses of steroids. Oral or injectable Dexamethasone 2 mg/ml .2-.3 mg/lb. day one, .1-.2 mg/lb. day two, .05-.1 mg/lb day three.

Dehydration: Fluids. Lactated ringers is preferable 100% oral if possible. Oral fluids get into the system within 20 minutes with minimum expenditure of energy. Subq fluids take up to two hours to absorb, cause the animal more stress and expend more valuable energy. Subq only if you cannot give orally. Tubing a squirrel is only recommended if someone is very practiced. Gatorade and unflavored Pedialyte may also be used orally.

Emaciation: If the animal is severely emaciated, introduce foods that take little energy to process such as simple sugars, dextrose or glucose and amino acids in liquid form. They also may need probiotics, Bene-bac to replace gut flora that has died off from lack of food. Slowly introduce easy to digest foods such as Nutrical mixed with hydrating fluids. Do not give them the maximum amount as per the feeding chart based on their weight or you can overtax their weakened system. Start with half of the recommended kcal and gradually work up to the 5% rule of thumb figure. Their stomachs also would have shrunk so it may need to slowly stretch back to normal size.

Diarrhea: Diarrhea is a sign of an underlying problem. You must treat the underlying cause. If the diarrhea is white or mustard yellow and is watery, mucousy or bubbly, it could have been caused by overfeeding the infant patient or introducing formula too quickly. Stop formula, go back to hydrating the baby until the diarrhea stops. Then slowly and gradually reintroduce formula. If diarrhea is greenish, it could be a bacterial infection. Have stool sample checked for parasites and ova and culture for bacterial infection. Use antihelminthic for cestode, nematode or trematode infections or a systemic antibiotic. Use Dri-tail to treat the symptoms of diarrhea.

Constipation: This is also a sign of an underlying problem. Insufficient water in the diet or an obstruction may cause the animal to be unable to have a bowel movement. Infants must of course be stimulated regularly before and/or after feedings until their eyes open. Offer additional water or clear liquids. Laxatone (cat hairball remedy), mineral oil, olive oil may also be given in moderation to soften stool and ease constipation. If there is blood or clots in the stool, there may be intestinal injury, blockage, intestinal twisting caused by fatal bloat or genetic disorder or damage. Human baby liquid glycerin enemas can be given gently using a smooth tip 1/2 cc syringe with a tom cat catheter with end clipped off and sanded/made smooth. If enema does not release easily, do not force. High fiber and oily foods like avocado may also help.

Gas/bloat: Sign of underlying problem generally formula being introduced too quickly or intestinal blockage. Mylicon human baby gas drops, 1-2 drops for babies before meals or hydration. Warm baths, gentle massage of the abdomen and back.

Aspiration: It's easy for baby ground squirrels to get fluids into their lungs while feeding on a syringe because they are so small. One needs to feed the baby slowly and carefully with a small syringe. If formula does come out of their nose, turn them upside down and blot formula off their nose a few times. Wait a few minutes before resuming feeding. If you hear a clicking sound when they breathe, they seem weak, are not that interested in eating, they may be aspirated and have pneumonia. Give them clavamox or amoxicillin at the first sign of aspiration. Continue for a few days. If they are not hungry, give them fluids only after they are better.

Parasites: As with most mammals, ground squirrels can carry an assortment of parasites. They can have regular dog and cat fleas, mites, ticks and lice. Always quarantine new patients. You can use flea and tick spray for small animals such as Ultra-care sprayed on a cotton ball and gently wiped over their body starting around their eyes and ears so the animals will not run in there and hide. You can also use mite and lice spray for birds, Scalex. Use as above. You can also use Advantage. Just one drop on furred babies and two drops on adults on the back of the neck. You can put the Advantage on the bedding of hairless babies away from their face.

Zoonoses: California Ground Squirrels at high elevation generally deep into the woods may have fleas that may carry plague. This is very rare. It's not been seen at lower elevations such as the beaches or low to mid elevation cities. Treat for fleas. 80% of all humans are immune to plague. The remaining 20% may experience flu-like symptoms which go away on their own. The infirmed, babies and elderly should seek treatment if the plague is suspected. Supportive care is only treatment.

As with any other warm-blooded mammal, they may also have rabies. This is extremely, extremely rare. Isolate any squirrel showing signs of neurological disorder in the absence of known head trauma. Use proper hygiene precautions to avoid exposure. If the animal dies, have the head tested by the State Health Department to determine if rabies was the cause of death. Rehabilitators should have pre-exposure rabies shots if they deal with high-risk species, vector animals, such as skunks, raccoons, foxes, coyotes and bats.

Bites: This is the most common danger to squirrel rehabilitators. The long sharp incisors can inflict bone-deep cuts in fingers. Squirrels generally warn before biting with chittering, tail swishing, barking and chirping. Don't ignore these signs. As ground squirrels have large cheek pouches, a full mouth is no guarantee against getting bitten.

\*California Ground Squirrels are considered by the state of California to be "agricultural pests." They are regulated by the Department of Agriculture. CGS may not be relocated without a permit from the Dept. of Agriculture. It is legal to rehabilitate CGS. They should be returned where found. They should never be released in a place with no CGS, next to agricultural crops, on golf courses, anywhere where they poison then, where they will soon begin construction or on private property without the consent of the owner. Release them away from human habitation if possible.

### **Literature cited**

Casey, Allan and Shirley, 2004, Squirrel Rehabilitation Handbook  
<http://www.ewildagain.com>

Hanes, P.C., 1998, Tunnel Rats: Ground Squirrel Rehabilitation, 13-lined Ground Squirrel and Rock Squirrel.

Hartson, Tamara, 1999, Squirrels of the West

Long, Kim, 1995, Squirrels: A wildlife handbook

### **Recommended reading**

Casey, Allan and Shirley, 2004, Squirrel Rehabilitation Handbook  
<http://www.ewildagain.com>

Hanes, P.C. 2002, Illness and Injury in tree squirrels

Hanes, P.C. 2002, Raising infant tree squirrels

### **Supplies**

The Squirrel Store

Copyright 2004 Mary Cummins - Squirrel Rescue

<http://www.thesquirrelstore.com>  
Almost all supplies needed

Dr. Fosters and Smith  
<http://www.drsfostersmith.com>  
Fish amoxicillin

Petco & PetsMart  
Caging, food, nest boxes, vitamins, mineral blocks, Dri-tail, formula, chews  
<http://www.petco.com> <http://www.petsmart.com>

Author's website  
Squirrel Rescue  
<http://www.mary.cc/squirrels>

### **How to become a licensed wildlife rehabilitator in Southern California, Region 5**

- Contact Fish & Game warden Joseph Baima [jbaima@dfg.ca.gov](mailto:jbaima@dfg.ca.gov) (858) 467-4201
  - Two years experience as a licensed satellite for another licensed rehabber, or a letter from a licensed rehabber stating that you've worked with them for two years
  - Two Fish & Game certified classes, one being the basic 1AB class and one being in your field of study.
  - Legal caging for babies and adult
  - Letter from closest rehabber stating they have no problem with you having a facility near them
  - Letter from city and county stating it's legally okay to rehab in your area
- (Not mandatory but good to include) Letters of recommendation, Resume, Photos of your caging

### SQUIRREL FEEDING CHART BMR x 3, Esbilac 1:2 water

<b>Body Wgt Gms</b>	<b>BMR Kcal/day</b>	<b>BMRx3 Kcal/da</b>	<b>Max cc's feeding</b>	<b>Kcal/feeding</b>	<b>Feedings/day</b>
15	3	9	0.8	0.72	12.5
20	3.7	11.2	1	0.9	12.4
25	4.4	13.2	1.3	1.17	11.2
30	5	15.1	1.5	1.35	11.1
40	6.3	18.8	2	1.8	10.4
45	6.8	20.5	2.3	2.07	9.9
50	7.4	22.2	2.5	2.25	9.8
55	8	23.9	2.8	2.52	9.48
60	8.5	25.5	3	2.7	9.4
65	9	27	3.3	2.97	9
70	9.5	28.6	3.5	3.15	9
75	10	30.1	3.8	3.42	8.8
80	10.5	31.6	4	3.6	8.78
85	11	33.1	4.3	3.87	8.55
90	11.5	34.5	4.5	4.05	8.52
95	12	35.9	4.8	4.32	8.31
100	12.4	37.3	5	4.5	8.29
105	12.9	38.7	5.2	4.68	8.27
110	13.4	40.1	5.5	4.95	8.1
115	13.8	41.5	5.8	5.22	7.95
120	14.3	42.8	6	5.4	7.93
125	14.7	44.2	6.3	5.67	7.8
130	15.2	45.5	6.5	5.85	7.78
135	15.6	46.8	6.8	6.12	7.65
140	16	48	7	6.3	7.62
145	16.5	49.5	7.2	6.48	7.6
150	16.9	50.6	7.5	6.75	7.5
155	17.3	51.9	7.8	7.02	7.39
160	17.7	53.1	8	7.2	7.38
165	18.1	54.3	8.3	7.47	7.27
170	18.5	56.6	8.5	7.65	7.4
175	19	57	8.8	7.92	7.2
180	19.3	58	9	8.1	7.16
185	19.8	59.2	9.2	8.28	7.15
190	20.1	60.3	9.5	8.55	7.05
195	20.5	61.6	9.8	8.82	7
200	21	63	10	9	7

# ANIMAL ADVOCATES

359 N. Sweetzer Ave., Los Angeles, CA 90048

(323) 651-1336

www.AnimalAdvocates.us

E-mail: Mary@AnimalAdvocates.us

ANIMAL \_\_\_\_\_ SEX \_\_\_\_\_ AGE \_\_\_\_\_ DATE \_\_\_\_\_

LOCATION FOUND \_\_\_\_\_

HISTORY (date found, why picked up, prior food, care, etc.) \_\_\_\_\_

YOUR NAME \_\_\_\_\_

YOUR ADDRESS \_\_\_\_\_

CITY, STATE, ZIP \_\_\_\_\_

PHONE (    ) \_\_\_\_\_ EMAIL \_\_\_\_\_

How did you hear about us? Who referred you? \_\_\_\_\_

I understand animals transferred to the above facility are, if possible, to be rehabilitated and released to the location found. There are no salaries at Animal Advocates and we are responsible for any and all cost of gas, retrieving, medical expenses, treating, rehabilitating, etc. of all animals. Any donation you care to make will help us cover these expenses and is 100% tax deductible and greatly appreciated. Your information will never be used for spam.

DONATION \$ \_\_\_\_\_ SIGNATURE \_\_\_\_\_

## TREATMENT RECORD

Initial exam/condition \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date	Treatment	Medication	Weight	Condition
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