

Hand-rearing and Rehabilitation of Orphaned Palm Squirrels, *Funambulus* sp.

Devna Arora

The Palm Squirrel



A young 5-striped Indian palm squirrel

Palm squirrels are palm-sized rodents with thick, bushy tails that belong to the genus *Funambulus* and the subfamily *Calloscuirinae*, a subfamily of squirrels found in Asia. The genus *Funambulus* comprises of 5 species of squirrels widely distributed in the Indian subcontinent with the subgenus of *Prasadsciurus* found right up to Iran.

For ease of classification and understanding of behaviour, I prefer to group these squirrels based on their proximity to human settlements. The two species of palm squirrels commonly found in urban, suburban and rural landscapes are:

- **Indian 3-Striped Palm Squirrel** (*Funambulus palmarum*) which has a more southern distribution and is commonly found in peninsular India and Sri Lanka.

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- **Indian 5-Striped Palm Squirrel** (*Funambulus pennanti*) which has a more northern distribution in India and is commonly found in central and northern India as well as Nepal, Pakistan and Iran.

The two species can easily be distinguished by counting the number of paler coloured stripes on the squirrel's back. The squirrels range from 22.5 cm to 40 cm in length, which includes a tail of 11–12 cm long, and weigh between 100–200 gm. Data suggests that palm squirrels live on average for 5-6 years in captivity although individuals have been known to live longer. They may only breed seasonally in the northern distribution of their ranges but breed all-year round otherwise.

Both species are highly gregarious and extremely adaptable, easily adjusting to a variety of living conditions and habitats and have spread well beyond their native range in recent years. They adapt easily to semi-modern constructions and thrive on human generosity and readily accept goodies from human hands. It is not uncommon to see individuals nesting in roof tops, false ceilings, unused attics or cupboards, etc.

The other palm squirrels found in forested landscapes are of course shy, comparatively rare, less adaptable and more specialized in their needs. They exist in restricted zones and habitats and are of course under looming threats due to intense deforestation, habitat degradation and fragmentation.

- **Dusky-Striped Palm Squirrel** (*Funambulus sublineatus*) is restricted to riparian habitats, particularly reedbeds, in southern India and Sri Lanka. Listed as Vulnerable on the IUCN Red List due to increased habitat destruction in its already limited distribution range.
- **Western Ghats Striped Squirrel** (*Funambulus tristriatus*) is endemic to the Western Ghats and locally common in forested landscapes and coffee estates of Maharashtra, Karnataka, Tamil Nadu and Kerala. The species is known to occur at elevations between 700 to 2100 meters above sea level. Although the species is listed as Least Concern on the IUCN Red List, the major threats to the species are habitat

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degradation and replacement of native trees by exotic ones, which the species appears to avoid, in managed landscapes.

- **Layard's Palm Squirrel** (*Funambulus layardi*) is endemic to montane, evergreen forests of central and south western Sri Lanka but is also found in lowland rainforests. Listed as Vulnerable on the IUCN Red List as it is under major threats due to deforestation and habitat degradation.

Nesting



Nesting material from a fallen nest

Indian palm squirrels commonly nest in the branches of trees, holes in the tree trunk or in man-made structures such as eaves of houses, attic spaces, electricity boxes, etc. Squirrel nests are made of grasses, threads, wool, cotton, jute fibres and other fibrous materials. Female squirrels sexually mature at 7-9 months of age and commonly give birth to 3-4 young after a gestation period of approximately 42 days. The young are referred to as kittens, kits or pups.

N.B. This protocol has been written based on my experiences with Three-striped and Five-striped Indian palm squirrels. Similar hand-raising techniques will be applicable for other *Funambulus* species as well. Rehabilitation and release techniques will of course differ as the other species require a more conservative approach.

Displacement of young

Squirrel young are only cared for by the mother and are often found after the mother has been killed in road accidents or by predatory animals, or are unable to care for the young due to debilitating injuries. The young are subsequently detected when they start wandering further away from the nest in search of her. Many displaced young are also found after their nests have been destroyed or blown away by heavy winds or storms. Kits are also often displaced accidentally due to human intervention while some young may even have been abandoned.

In spite of these temporary setbacks in the initial stages of their lives, the careful application of rehabilitation techniques ensures successful release and post-release survival of the young.

Before rescue

Before attempting to rescue any orphaned or distressed animal, you must ensure that it is truly in need of rescue. People often find animal young unattended while the mother may well be keeping a watchful eye on the young from a safe distance away. Often, people accidentally stumble upon the young animal's hiding place to which the mother will return to after foraging. The young must not be picked up or displaced until it has been ascertained that the mother will not return.

To ensure safety from predators the young must only be watched from a safe distance away or the mother will be reluctant to approach her young. Any sudden movements that might scare the mother away must be avoided. Movement around the kits must also be avoided as it would expose the kits' hideout and bring them to the attention of potential predators, thereby compromising their safety.

If the kits have been found just before dark, it would be advisable to keep them in a safe, warm place for the night, and then attempt to unite them with the mother at the break of dawn. Palm squirrels are diurnal in

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nature and even while she may be in the vicinity of the kits, the mother may be unable to look for them at in the absence of light.

If the young must be picked up or handled, it is advisable to locate the nest and place them back in the nest at the earliest. If the nest has been destroyed, the kits may be placed in a small box which acts like a replacement nest, and securely placed as close as possible to the original nest. The new nest may simply be lined with clean cloth and nesting material from the broken nest. An access route for the mother to enter the new nest must be ensured before placing the nest. It must be ascertained that the mother has returned to the new nest or the kits will have to be hand-raised as a last resort.

Only animals genuinely in distress must ever be rescued. The young must be raised in a manner making them independent and able for release, and must be released at the appropriate age, time and place. If a lone youngster has been found, it would be advisable to keep an eye out for its siblings as there might be other young ones in need of help too. A veterinarian must be contacted immediately should the squirrel need any medical help.

General guidelines for hand-rearing orphaned squirrels



A neonate palm squirrel

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Hand-rearing an infant is a challenging task that requires outstanding dedication and commitment. They not only need to be cared for round-the-clock but are also extremely delicate and require exceptionally tender handling.

The hand-rearing of wild animals must also be approached ethically, taking into consideration the future implications and needs of young animals. All wild animals have the right to be free and must be raised in a manner without compromising on their release potential. The process of rehabilitation too must begin at the appropriate age to maximize their release potential and chances of survival after release.

Hygiene

Young animals have underdeveloped immune systems and are extremely susceptible to infections. It is vital to maintain very high standards of hygiene when handling the young. Hand-raised animals are at a further disadvantage of not having received their mother's milk and the antibodies they would receive through her milk and need special care in terms of handling and hygiene.

It is essential to always wash your hands thoroughly before handling the kits especially when they are under 2 months of age. It is also important to clean your fingernails after cooking or eating food, chillies, pickles, *chiwda* (a spicy, savoury mix), etc. as the spices tend to get caught under the nails. Owing to their small size, the hands inevitably come in contact with their eyes while handling the kits, thereby, unintentionally smearing the eye with spices that may burn or irritate the eye intensely. Similarly, wash your hands thoroughly after touching any harmful chemical substances like mosquito mats, insecticides, bleach, etc.

You must wash your hands and arms thoroughly after touching any carnivorous or predatory animals like dogs, cats, snakes, birds of prey, etc. It is even recommended to change into a fresh set of clothes if the animals have been handled closely. The carnivore smell on the body will either scare the young squirrels or habituate them to carnivore smell,

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and thus their presence, in close proximity. Habituated animals are less fearful of predators and are hence more likely to fall prey as their flee-response is reduced. Similarly, predatory animals must never be housed in the same room or in close proximity to the young squirrels.

Like any other mammal, squirrels too can carry rabies. Although, young squirrels are rarely aggressive, it is important for the safety of the handler to not get bitten by the young. In case of a squirrel bite, please contact a doctor or veterinarian and follow the appropriate treatment.

Hypothermia

Animal young have higher basal body temperatures and should feel warm on touch. Prolonged exposure to the cold can result in hypothermia, a condition in which the body temperature falls substantially below normal and can prove to be fatal for the young. Thermoregulation is poorly developed in young infants and they are unable to produce body heat to warm them. Consequently, they are often in a hypothermic state when found. Even though thermoregulation develops by the time the kits are fully furred, injured and sick animals may also require an external heating source to maintain their body temperatures.

Heat stress

If the young have been separated for a longer duration and are in a warm location, their body temperatures are likely to be elevated beyond normal. Thermoregulation being poorly developed in the young, they are unable to cool themselves down either. It is important to first slowly bring down the young one's body temperature by placing them in a cool and well-ventilated area. They can also be offered a cool (mildly cold, not chilled) hydration formula as it helps in hydrating the young and bringing down their body temperatures.

N.B. The young must never be either cooled or warmed too quickly.

Dehydration

Water constitutes a high percentage of body weight in young animals and they get dehydrated easily when not given suitable feeds or fed at irregular intervals. Due to the time lag between having separated from their mothers and having been found and reached a rehabilitator, most young animals are often quite dehydrated when they first arrive at rescue centres. The young can easily withstand the lack of food for a day but will not survive if dehydration levels peak.

Dehydrated young are unresponsive and listless. Their skin appears wrinkled; they have a weak grip and are unenthusiastic to feed. The Skin Turgor test, commonly referred to as the Tent Test, can be used to test the young for dehydration. Gently pinch a small amount of skin on the squirrel's back, to form a tent, then let go. The skin quickly goes back down to normal when well hydrated, but takes longer to go back to normal, making the "tent" more evident when the young are dehydrated.

Similarly, a very hot hot-water bottle must never be used for the young as it dehydrates them very quickly. The ambient temperature in the box can be gauged by placing your hand in the box five minutes after placing the hot-water bottle. If the box feels too warm and uncomfortable, the warmth of the bottle should be reduced immediately and the box ventilated to bring down the temperature.

Re-hydration

Lactated Ringers and Pedialyte are excellent oral rehydration solutions and are advisable for cases of severe dehydration. A homemade oral rehydration solution can be made using the proportion of 1 litre of water, 1 teaspoon of salt and 3 teaspoons of sugar, but must only be relied upon as a last resort as it cannot replenish other essential salts received through rehydration solutions.

Although the kits must solely be offered a rehydration solution when they are severely dehydrated, they can be offered a diluted feed if they

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appear to be mildly dehydrated. Feeds can initially be begun with a ratio of 60:40 feed and water with a teeny pinch of electrolytes, e.g., Electral powder if they appear mildly dehydrated. The electrolytes must be discontinued as soon as the kits start to appear hydrated. Smaller and frequent feeds must be offered to the young until their hydration levels reach normal.

Water and Digestion

The kits must always first be re-hydrated before putting them onto a regular feed as rehydration and digestion are both mutually exclusive processes. Water is not only a prerequisite for digestion but also enables the body to perform other vital functions. When food is introduced in to the stomach, the stomach draws out water from other cells of the body to aid the process of digestion. Even a dehydrated body will give up fluids to aid digestion, leaving the body further depleted of fluids. Water in the stomach is only absorbed after it reaches the small intestines and proves to be insufficient to refill the deficit that has already been created. The digestive demands made by food thus cause a further depletion of body fluids and exacerbates dehydration which can prove to be fatal for the young if not addressed on priority.

Minimizing imprinting

Imprinting is a process by which a young animal learns and impersonates the behaviour patterns of its biological or surrogate parent, be it human or any other animal. This imitation enables wild animals to acquire the necessary behaviour traits and greatly assists in their survival.

Hand-raised young, however, imprint on their surrogate parents, thereby learning new traits and often forgoing behaviour patterns essential for its survival in the wild. It is therefore advisable that the young only be handled by as few people as required. This ensures that they only look upon their foster parent for comfort and not seek security from human beings in general.

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For similar reasons, the young must not be housed with animals of different species as they may begin to impersonate the behaviours of the other species, which might not be advantageous for their survival. Housing the young with conspecifics however encourages play behaviour, communication, interdependence and the manifestation of behaviour traits more apt for their survival in the wild.

Housing the young

Animal young must always be housed in a warm, safe, dark and quiet place. Young under the age of one month can ideally be housed indoors as it is safer and undisturbed inside. The ambient temperature too can be better regulated when indoors. The young can be moved to a suitable outdoor enclosure after the age of one month but must be protected from the elements, for e.g., excessive sun, rainfall, or stormy winds, and must be provided with a warm and safe place to return to whenever they feel the need to do so.

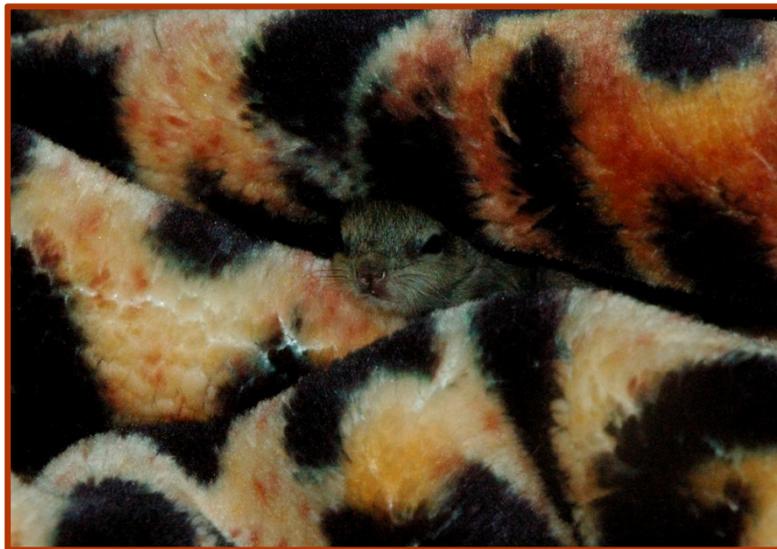


A box for housing young squirrels

A **box** of approximately 2 ft. in length and 2 ft. breadth, and 2 ft. high, with some holes towards the top for ventilation, will be adequate for the kits to sleep in. The box must have a lid, especially when the young are less than a month old so the kits cannot crawl out when left unattended. A wicker or picnic basket may be used for the same purpose but it may not be ideal for retaining the warmth in colder climatic conditions.

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To enhance their feeling of warmth and security, it is recommended to simulate the conditions of the nest when the kits are placed in the box. Even with the lid of the box closed, the kits prefer to be covered by some soft material, particularly in colder weather. Leaving a fold of cloth for the kits to crawl under replicates the presence of the mother and adds to their feeling of comfort. The kits would prefer not to be covered only when the ambient temperature in the box becomes uncomfortably high. It would therefore be important to recheck the temperature in the box if the kits seem to be uncovered, and reduce the warmth and/or increase the ventilation to achieve the temperature.



Snuggled in a blanket

A litter of 4 squirrels can comfortably be housed in the above-mentioned space but only kits from the same nest, i.e., siblings, must be housed together. Kits from different nests can be kept together but the litters must first each be quarantined separately for at least a week and known to be healthy to prevent any chances of cross infection. It is advisable to house different litters together especially when you have just one kit in any one of the litters, but they must first be quarantined. Kits from the same nest must never be separated unless absolutely required. Keeping the young together allows them to bond more with each other than with the keeper and become more independent. It also develops their social skills and reduces the extent of taming, thereby giving them a better chance at survival after release.

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It is important to keep a careful watch on the young when housing squirrels with other animals in the same room or enclosure for a squirrel may easily bite or injure other small animals.

A warm blanket or towel can be used for bedding for the young. A fresh and clean set of bedding must be used and washed frequently thereafter. Bedding for sick animals must be kept separate and either sterilized or washed at high temperatures before use again.

Fleece material, e.g., yellow dust cloth used for vehicles, must never be used for kits under 1 month of age. The kits have a tendency to look for the mother and try to suckle on the fibres of the fleece material in their sleep. In doing so, they can ingest the cloth fibres and choke to death.

A hot-water bottle, heating pad or heating lamp is essential for providing external heat for young. If none of these are available, a soda or drink's bottle may be used as a substitute. The hot-water bottle must always be wrapped in at least 2 layers of cloth (or 1 layer of a thick material) before placing the kits on or near the bottle. The kits need to be monitored closely to prevent either chilling or overheating.

The kits must never be permitted to come within reach of an uncovered bottle as they can get scorched. Care must be taken not to leave any space for the kits to crawl under the bottle. To prevent accidental scalding, the hot-water bottle and drink's bottle must be checked for leakage each time before use. New hot-water bottles too have been found to be faulty and must be tested before use.

A quartz alarm clock too has been recommended to reassure the young. The ticking of the clock replicates the rhythm of the heartbeat, simulating the mother's presence and reassuring the young. The clock can be covered in cloth and placed inside or just outside the box. Ensure to turn the alarm off before using a clock for the kits.

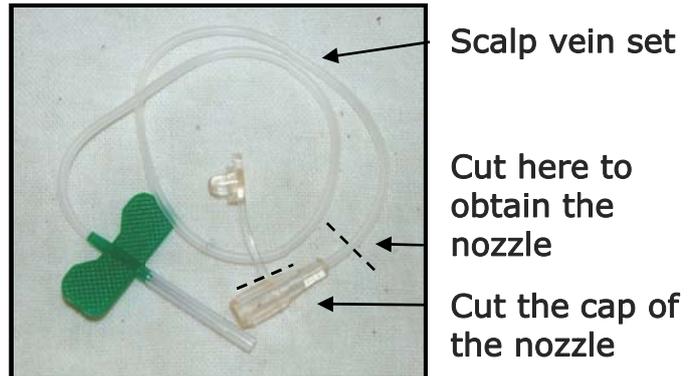
Although **squirrel feeders** are not manufactured or sold in India, they are available in specialized shops abroad and can easily be imported beforehand. A feeder can be also fashioned either using a pipette or a

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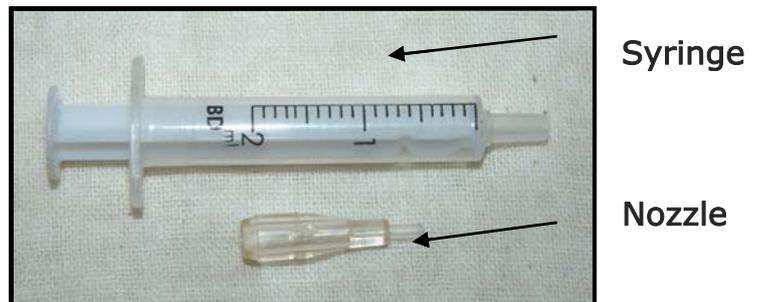
syringe with the nozzle of a scalp vein set. A 1-2 ml syringe would be ideal for smaller infants while larger syringes are more practicable for older kits. Droppers must be avoided as they are difficult to sterilize.

Assembling the feeder from a syringe and scalp vein set

1. Cut the part of the scalp vein set that would be attached to the syringe, as per the directions in the photograph alongside, to obtain the nozzle. A 23Gx $\frac{3}{4}$ " scalp vein set would be ideal for smaller kits, while a 21Gx $\frac{3}{4}$ " set for older kits.



2. The nozzle forms a makeshift nipple for the syringe and gives the feeder a softer touch which is more comfortable for the young.



3. Attach the nozzle to the syringe to make a feeder.



Feeders and hygiene

It is of utmost importance to maintain very high standards of hygiene while feeding the young. The gut wall is much more permeable in

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younger animals and toxins from infections in the gastro-intestinal tract can easily seep through the gut wall and cause systemic toxemia or generalized infections in the young. It is therefore absolutely essential to sterilize the feeders after every meal to prevent any bacterial infections.

A simple steam sterilizer or an ordinary kitchen pan can be used to sterilize the feeders. All parts of the feeder must be detached and rinsed in normal water, and then immersed in water and boiled for 2-5 minutes after the water first comes to a boil.



The feeders will need to be replaced periodically when using disposable syringes. The rubber bulb at the base of the plunger of disposable syringes hardens after sterilizing it a few times, jamming the feeders and making them unsafe for use. Consequently, the feeders, i.e. syringes, must be replaced to ensure smooth and safe feeding of the young.

Soap must never be used to clean the feeders. The feeders are very small which makes it impracticable to either thoroughly clean them from the inside or rinse them free of soap residue after cleaning. Inadequate cleaning of the feeders would lead to dangerous levels of bacterial growth on the feeders while leaving soap residue in the feeder too would be very harmful for the young. The easiest and safest method of cleaning the feeders is therefore by sterilizing them.

Feed composition

Diet is a crucial factor in the growth and development of the young. It is vital to offer the young a healthy, nourishing and easily digestible feed. The milk-replacement formula used should be kept as close to its mother's milk as possible. Squirrel milk is high in density and contains 23-39% of dry solids. The feed must therefore be supplemented with

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additional fats and proteins when using cow's milk as a base. This must be done cautiously as excessive fats and sugars in the feed can lead to diarrhoea. Lactose too poses a serious challenge when using cow's milk for the young.

**Table: Comparison of the milk composition of squirrels and cows
(Bourne, undated; Trendler, 2005)**

Animal	% Fat	% Protein	% Carbohydrates	% Ash	% Dry Solids	% Water
Squirrel	10.45	9.2	3.4	-	-	-
Grey Squirrel	67	20	10	-	39.6	-
Cow	3.7	3.2 - 3.3	4.6 - 4.8	0.7	12.5	87.6

Suitable milk replacers like Esbilac's puppy milk replacer or any other puppy milk replacers are recommended for hand-rearing squirrel babies. However, these are not available in India and infant milk formulas like Farex milk, Lactogen, Nan, etc. may be used instead. Depending on their age, the kits may be given a combination infant milk formula, boiled egg yolk and infant cereal preparations like Farex or Cerelac to meet the nutritional requirements.

It's essential to add vitamins and minerals to the kit's diet but must be done carefully as an excess can cause diarrhoea. Any good veterinary or paediatric vitamin drops can be used for the young. The addition of probiotics like Sporlac, Bifilac, or Vibact, that mainly contains the beneficial lactobacilli bacteria is also extremely helpful. Use of digestive enzymes, for e.g. lactaid, too may be required and beneficial for the kits. The amount of probiotics and enzymes will depend upon the strength of the preparation being used and the exact dosage can be obtained from a veterinarian.

Using formula milk

Only boiled water must ever be used to prepare the feed. Refrain from preparing the feed in plastic containers as there are concerns over chemicals like BPA leaking into the formula if stored and heated in plastic containers. A fresh batch of feed must be prepared every day as using

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stale feed can lead to infections. Feed prepared for the day must be immediately refrigerated upon preparing and only the quantity required per feed must be heated each time. The remainder of the feed must be discarded after feeding the kits.

N.B. The feed must never be reheated more than once as it promotes bacterial growth and can lead to severe food poisoning.

Feed for the neonates

New-borns at birth would be fed on Colostrum, the very first milk produced by the mother at parturition. Colostrum is very thick, creamy and yellowish in colour, and has high concentrations of proteins, nutrients and anti-bodies that are essential to protect the new-born against many infections at birth. Neonates that haven't received colostrum need particular care in terms of hygiene as they lack the maternal anti-bodies that help to fight infections.

The neonates can be given a milk substitute like Farex Milk, Lactogen or Nan, until their eyes open. Prepare the feed as per the instructions given by the manufacturer and dilute the feed to a proportion of 70:30 feed to water (boiled water) for the kits initially as the feed can be heavy for the young to digest. For kits that have settled and are digesting the feed well, the feed can be prepared to normal strength. By the time the kits are a week old, boiled egg yolk must be introduced to their feeds. Add vitamin drops, probiotics and enzymes to the feed as mentioned in further pages.

Formula to be used once the eyes open

6 tablespoons of water + 1 scoop of Farex milk + ½–1 scoop of Farex or Cerelac wheat/apple + 10–25% egg yellow (boiled egg only)

Feed for older kits can be prepared using either fresh milk or a milk substitute, although infant milk formula, when available, is certainly

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preferred. A mix of 6 tablespoons of water with 1 scoop of Lactogen will equal 7 tablespoons of fresh milk.

The addition of Farex wheat/apple and egg to the feed must slowly be started with the addition of ½ scoop Farex and 10% egg yellow at 2-3 weeks of age, and gradually increased to 1 scoop Farex and 25% egg yellow over the following 2 weeks. It is essential to add egg yellow and Cerelac to the feed as it increases the density and calorific value of the feed and provides better nutrition for the growing young.

Egg yellow also contains many essential minerals and fats which increase the nutritive value of the feed. Raw eggs can carry the bacterium, *Salmonella Enteritidis*, which can lead to severe food poisoning and pose a serious threat to the young. Pasteurised eggs, if available, may be used raw, but only hard boiled eggs must be used otherwise.

Once the kits have accepted and digest the feed well, paediatric vitamin drops and gripe water must be added to alternate feeds. The addition of vitamin drops and gripe water can be started with a droplet (very small drop) of each to alternate feeds and gradually be increased to 2 drops in alternate feeds over two weeks.

Feed consistency

Feed for the neonates would be of the consistency of milk, whereas feed for older kits must be of a slightly thicker consistency than milk, for e.g. much like milkshake. It is essential to prepare the feed to the right consistency as thicker feeds provide inadequate water for the young and can prove to be very heavy for the kits to digest. Diluted feeds on the other hand will not provide adequate nutrition for the young, consequently affecting their growth and development.

Feeding

The young must always be given a warm (never hot) feed, simulating the temperature at which the young would receive milk in nature as it is

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soothing, easier to digest and they feed better. The feed must never be hot as it will scald the young's oesophagus and intestinal lining causing severe damage and inviting infections. Cold milk on the other hand must be avoided altogether as it can chill the young and even cause cramps. The temperature of the feed must be tested each time before feeding the kits by dropping a few drops on your hands. The kits must be given small feeds frequently as longer gaps between the feeds tend to weaken them.

Squirrel babies naturally like to lie on their stomachs, much like little puppies do, when feeding from the mother. It is unnatural for them to lie in any other position and forcing them in unnatural positions while feeding them can affect their suckling reflex and lead to aspiration of the formula. They are also more likely to struggle to turn back on their stomachs if held in unnatural positions, causing an unnecessary struggle and mishaps during the process of feeding.



Correct feeding posture
Photograph clicked by Gargi Prasad

It is therefore extremely important to hold the young horizontally (like in the picture above) while feeding them to ensure smooth feeding and prevent aspiration, i.e., inhalation of the formula. This also prevents the feed from entering the trachea in case too much feed is accidentally pushed in as the surplus feed can drip down the sides of the mouth.

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The kits must be fed slowly while maintaining a steady pressure on the feeder and allowing them to suckle. Older kits will suckle on the feeder much like they do from a bottle and care must be taken to prevent them from suckling the feed too fast. Smaller and weaker kits, on the other hand will have a weaker suckling reflex and require small breaks during the feed to allow them to catch up on their breaths before continuing with the feed.



Pausing in between feeds

N.B. If unsure about how to feed the young, it is safer to drop tiny droplets of milk on their tongue and allow them to lick it.

Never use excessive force whilst still feeding the kits if the feeder appears to be stuck. The feeder must be removed from the kit's mouth and readjusted until the obstruction has completely been removed before continuing to feed. This prevents accidentally squirting too much feed into their mouth and aspirating the young.

Aspiration pneumonia

The repeated inhalation of either oropharyngeal or gastric contents, for e.g., milk, into the lower airways can lead to an infectious process causing aspiration pneumonia. Aspiration pneumonia is one of the most common causes of mortality in hand-raised animal young and every care needs to be taken to minimize this risk. It is vital to ensure the use of the correct teat and size of the teat hole, correct feeding position and handling during feeding, correct milk temperature and avoidance of overfeeding or force feeding to prevent aspiration pneumonia. If it is suspected that the kits have aspirated the feed, for e.g., the kits sneeze or cough up milk after a feed, a veterinarian must be consulted to begin the preventive treatment without delay.

Weaning

Indian palm squirrels are weaned off at 8-10 weeks of age. The frequency of milk feeds for the kits can be reduced by a feed every week until weaning period, but most kits like their bedtime feed to be extended for a few more days. Interaction with the kits must also be reduced during the weaning phase as it creates some detachment and encourages their independence, thereby giving them better chances of survival after release.

Milk is an ideal source of protein and calcium, and weaning the kits early can compromise on their growth and development, while extending bottle-feeding only results in humanising them further more. Although hand-raised young solicit to be bottle-fed for longer than their wilder counterparts, they should be weaned off at roughly the same time as they would normally be weaned off in nature.

Ano-genital stimulation

The muscles and control of the gastric tract are poorly developed in animal young and it is essential to stimulate the ano-genital area very gently with a warm, wet cloth after every feed for the first 3-4 weeks of the young one's life. This encourages urination and defecation. A gentle body rub, with emphasis on the bottom half of the body, the upper thighs and the buttocks, will also encourage urination and defecation. Failure to do so can result in constipation, bladder problems, uraemia, toxemia and megacolon. Ano-genital stimulation is extremely important in animals that are weak or have calcium deficiencies.

Squirrel droppings

The droppings are a good indicator of digestion. It is essential to keep an eye on the kit's droppings to make sure they digest their food well. The droppings should be well formed and will appear somewhat granular and yellow-brown in smaller kits that are only being fed formula.

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Nevertheless, the droppings shouldn't be too sticky and you should be able to lift it with a piece of tissue without causing any staining.



Squirrel droppings
when only on milk



Adult squirrel
droppings

It will be necessary to make changes to their diet if they don't digest their feed well. Once they cross the age of one month and start eating other foods, their droppings will be like those of adult squirrels (and much like those of rats) – black, hard pellets.

Warmth and well-being

Always keep the kits warm and hold them in your hands or on your chest for at least 2 hours every day, especially when you have just one young one. This is extremely important as it gives them a feeling of security, and they thrive on physical contact. The kits primarily vocalize when they need something, especially when they are hungry or if the temperature of the box is either too warm or too cold. Often, the kits will even vocalize when they just want to be held. It is important to check up on them once they vocalize as ignoring them for prolonged periods will lead to a feeling of neglect and insecurity and affect their growth.

The kits must be given a gentle body rub, simulating the mother's licks, after every meal. They thoroughly enjoy this, and it adds to a feeling of well-being and security for the young. The kits feed well and in turn grow better and healthier when they grow with a feeling of safety and comfort. It is also a good practice to gently sponge the kits with a soft cloth dipped in warm water 2-3 times a week as it helps keep them clean. The

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kits must only be sponged (never bathed) during the day and immediately be dried up using a dry towel. They must never be sponged at night as it can rapidly chill the young. Also, a hairdryer must never be used to dry the young.

Sexing squirrels



Male squirrel: Testicular growth at 2 months of age



Female squirrel: Underbelly exposed

The vulva of the female is located lower in the body, closer to the anus whereas the penis of the male is located higher up and closer to the umbilical cord (difference visible in the photographs above). Although sexing neonates can be tricky, the testicles of male squirrels are very obvious once they are over a month old.

Ectoparasites



Squirrel fleas (magnified)

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Young squirrels only start grooming themselves at 4-6 weeks of age and can groom themselves effectively by 8-10 weeks of age. It is important to groom them until they are independent enough to do so themselves. Young squirrels, if furred, often come in when fleas on them and any visible fleas must be removed while grooming the kits. Squirrel fleas are 0.5-1 mm in size and soon turn into severe infestations if left unattended.

Frontline or Protektor spray (containing Fipronil, a broad spectrum insecticide) has been used successfully to treat severe infestations of fleas. One spray on the young one's back and one spray on the belly should suffice for the treatment of fleas. It must be ensured that the solution does not come in contact with the eyes or ears. The guidelines in the literature provided along with the spray must be strictly followed for optimum results and the safety of the kits. The kits must be allowed to dry up themselves after the application of the spray. The spray must therefore only be used during the day as it takes a while for the kits to dry up and they might catch a chill if left sodden for long at night.

The fleas tend to multiply in the kits' bedding and will repeatedly climb onto the squirrels from their bedding. It is therefore important that the fleas not only be eliminated from the kits but also from their bedding. Although it is ideal to use a fresh set of bedding after the application of the spray, the spray can also be applied to the bedding to eliminate the fleas.

Caution: Flea sprays are very toxic.

The effects of their toxicity on squirrels are unknown. The spray must be used very cautiously and would necessitate a watchful eye on the young for a couple of hours afterwards.

The above mentioned sprays can both be purchased from a veterinarian or a pet shop. It is recommended to consult a veterinarian if unsure about its usage.

Summary of the stages of development of Indian palm squirrels

<u>Age</u>	<u>Characteristics</u>	<u>Care</u>
0-1 weeks	Naked, called 'Pinkies', Eyes closed, Ears pinned back	Feed diluted Lactogen, 0.05 – 0.1 ml per feed Min. 9 feeds a day
1-2 weeks	Fur and pair of lower incisors begin to erupt, Poor thermoregulation	Feed 100% Lactogen, 0.2 – 0.4 ml per feed Min. 8 feeds a day
2-4 weeks	Eyes open, ears unfold, Respond to sight and sound	Introduce Cerelac and boiled egg yellow to feed, Lots of warmth
5-6 weeks	Thicker fur coat, Tail becomes bushy, Plays after feeds	Introduce soft foods like banana and apple, Introduce water
7-8 weeks	Teething, Rapid motor development, Very inquisitive, Naughty	Offer more solid foods like fruits, seeds, nuts, Reduce milk feeds
8-10 weeks	Start becoming independent, Need for space and freedom	Begin weaning, Mostly solid feeds, Reduce milk content of feed
10-12 weeks	Get adult fur coats, Diurnal activity, Starts playing on trees	Completely weaned, Reduce human contact
12-16 weeks	Expand range, Territorial behaviour, Full set of adult teeth	Acclimatization, Ready for soft release
16-18 weeks	Reach 90% of adult size and 80% of adult weight	Release, Post-release monitoring

Stages of growth and the corresponding care

The feed quantities outlined below are the quantities required by an average-sized squirrel. Some young are born bigger and may require and consume larger quantities of feed than the ones outlined below. Likewise, there may be some individuals that are smaller or weaker and may consume smaller quantities of feed until their health picks up. Fresh arrivals also tend to accept smaller quantities of feed until they have stabilized and have settled down and adjusted to the handling and feeding. The young must be monitored continually to ensure that they look healthy and satisfied.

Week 1

New-born squirrel babies, commonly referred to as 'Pinkies', are born naked and pink in colour with eyes tightly closed and ears closely pinned back. Although they are born naked, the stripes on the back are clearly visible. The young are 3–4 cm long at birth, with a 2–3 cm long tail and weigh 5–8 grams. The young are extremely delicate at this stage of life and need rather tender handling and care.



Pinkies: 2-3 days old

Feed: [Please refer to the note on Formula on page 16] The pinkies must initially be started on a diluted feed with a ratio of 70:30 milk formula to water. This also helps to address mild dehydration. The feed may be increased very gradually to 100% of milk formula over a week once the kits appear to digest the feed well. It is advisable to add half a tiny

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droplet of vitamin drops, after stabilizing the young, to any two feeds of the day, preferably one in the morning and one in the evening. It is also necessary to dust a very tiny amount of probiotic powder on to alternate feeds. Care must be taken not to add much of either vitamin drops or probiotic powder to the feed as the feed quantity is minuscule.

Quantity per feed: The young will consume roughly 0.1 ml per feed for the first few days of their life. The quantity must gradually be increased by 0.05–0.1 ml per feed over the course of the week. The young should consume roughly 0.2 ml per feed by the end of the first week. The kits must be allowed to have a tummy-full if they prefer to feed more, but they must never be forced un-necessarily as it only does them more harm than good.

The new born must consume at least 1 ml of feed every day for the first few days of its life, and a minimum of 1.5 ml every day by the end of the first week. If the young seem to consume less than the minimum daily average, it will be crucial to increase the frequency of feeds, but never the quantity of the feed, to make up the daily average.

Feeding frequency: Pinkies require a minimum of 8-9 feeds per day. Each feed should be 2–2½ hours apart. Feeding must begin by 5-6 am and continued until midnight. Feeding through the night is absolutely unnecessary and the new-borns can be given a 4-6 hour gap between their feeds at night. Each feed must take 4-5 minutes and the flow of the feed must be adjusted accordingly. At this stage, it is best to just drop extremely tiny droplets on the kits tongue, allowing her to swallow slowly. It is vital not to hasten the speed of the feed as it can easily result in aspiration in the young of this age.

N.B. 1 ml = roughly 20 drops; 0.1 ml = roughly 2 drops

These two drops must be divided into at least 5-10 portions and then fed to the young over a few minutes.

Special care: The normal body temperature of squirrels is 100°C – 102°C. The young must therefore always feel slightly warm on touch. Pinkies must be kept warm and require an ambient temperature of 27°C

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– 29°C for the first couple of weeks of their life. They will require a warm (never hot) hot-water bottle throughout the day when kept at room temperatures, particularly in colder weather. The hot-water bottle must be checked every time the young are fed as it needs to be refilled with warm water every 3-4 hours. Babies found during the hot Indian summers may not require a hot-water bottle during the day but this will be subjective to the housing conditions and the kit's health.

Week 2

The young rapidly put on weight in the first few weeks of their lives, their skin pigmentation gradually becomes darker and teeny bits of hair begin to cover the entire body. There is a noticeable slit in the eyelids, the ears start to unfold and the lower incisors begin to erupt in the second week. The kits begin to respond to sounds by the second week of their lives.



Fur begins to cover the body



Noticeable slit in the eyelids

Feed: Same as the feed for week 1. Boiled egg yolk can be introduced to their feed in a couple of feeds every day.

Quantity per feed: The young would consume 0.2 ml per feed by the beginning of the second week. The feed must gradually be increased by 0.05–0.1 ml per feed every other day and the quantity of feed must be brought up to 0.4 ml per feed by the end of the second week.

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Feeding frequency: The young require at least 7-8 feeds a day. Each feed should be 2½–3 hours apart and the pinkies can now be given 6 hour gap between their feeds at night.

Special care: Same as that for Pinkies of a week's age.

Week 3

The kit's eyes start to open in the 3rd week, typically at/after 15 days of age. The kits slowly start responding to visual stimuli by the end of the 3rd week.



Eyes open at/after 15
days of age

Recognizing the smell
of the hand

Feed: A quarter scoop of Cerelac and roughly 10% of an egg yellow can be added to the day's feed initially while introducing the kits to the new feed. A tiny droplet of gripe water can also now be added to alternate feeds. [Please refer to the note on Formula on page 16].

Quantity per feed: The feed must gradually be increased to 1.0–1.2 ml per feed when they are on 7 feeds a day and up to 1.5 ml per feed for 6 feeds a day. The young should now consume an average of 9 ml of feed each day.

Feeding frequency: The kits must be given 6-7 feeds a day at the beginning of the week and the frequency of the feeds can gradually be

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reduced to 6 feeds a day. Each feed should be 2½–3 hours apart. The kits can now be given a 6-7 hour gap at night.

Special care: The kits may now be housed at ambient temperatures of 25°C and will require some additional warmth when kept at room temperatures. The warmth of the hot-water bottle can now be reduced during the day, unless it is a chilly day, as the young now have a small coat of fur and hence some additional warmth. Thermoregulation is also sufficiently developed at this stage and they retain heat better.

Week 4

The squirrels will now start to move around and play a bit after their feeds, much like a little puppy. They must be tucked back into their box once they finish playing as they will now sleep until their next meal.



Enjoying a body rub
after her meal



Tasting fruit for the
first time

Feed: Same as the feed in week four but the quantity of egg yellow and Cerelac can now be increased. Soft and easily digestible fruits like banana and apple should be introduced at this stage even though the kits will only initially lick and suck the juice of the fruit for the first few days before they start to nibble on the fruit itself.

Quantity per feed: The feed quantity must gradually be increased to 2–2½ ml per feed.

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Feeding frequency: The frequency of feeds can now gradually be brought down to 5 feeds a day with a gap of 3 hours between each feed. The kits can now be given an 8-hour gap between their feeds at night.

Special care: A hot-water bottle will no longer be required during the day unless it is a chilly day. The kits must nevertheless be housed in a warm and dry place. The warmth of the hot-water bottle at night can also now be reduced.

Week 5

The kits start becoming active at the age of a month. They must be given plenty of freedom to run around and play in order to get exercise and for their muscles to develop well.



First drink of water



Kits often curl up and sleep

Feed: The ratio of Cerelac in the feed (for the entire day) can now be increased to 1 scoop and egg yellow to 1/4th of the egg. The vitamin and paediatric drops too can be increased to 2 drops of each in alternate feeds.

Solid foods should now be introduced into the kit's diet. The kits will be least interested in new foods when on a full stomach and solid foods must therefore always be offered before the feed, when the kits are hungry, i.e., an hour before their feed. This encourages them to taste and eat the new food offered.

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As the kit's reliance on solid foods begins to increase and their feed becomes thicker (especially with the addition of Cerelac and egg yellow), they will require additional water to maintain their hydration levels. A fresh bowl of water must be offered to the kits every day now onwards as they will start to drink water by this stage. It may take them a day or two to learn to angle their mouths correctly and keep their nose out of the bowl, but they'll get there.

Caution: The kits must initially be offered solid foods only when under supervision as they sometimes swallow too big a morsel of food which may get stuck in their throat. This is most likely to happen when there is more than one young and the kits try to eat hurriedly in competition with one another.

Quantity per feed: The quantity of feed must gradually be increased to 3-4 ml per feed.

Feeding frequency: The feeds must gradually be reduced to 4 meals a day, 3-4 hours apart. The kits can now be given a gap of 8-10 hours between their feeds at night. They must also be given plenty of solid foods throughout the day.

Special care: The squirrels will now start becoming very active and inquisitive and will want to thoroughly explore their surroundings. It is extremely important to squirrel proof the house especially if hand-raising the young from home. You must ensure that nothing can accidentally fall on them. All important documents, wires, laptops, etc. must be kept out of reach as they will now also start to nibble on everything.

Week 6

The kits are very inquisitive and naughty by this stage. If you remember watching the cartoon Chip 'n Dale as a child, I would say that they are exactly as that! They also start teething by this age and will chew on anything soft that they can sink their teeth into.

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Enjoying the warmth
of the modem



Simply being inquisitive

Feed: The kits must consciously be shifted onto solid foods by now. Including solid foods early on in their diet eases the transition from milk to solid foods during weaning. Solid foods offer the additional benefit of giving the kits something to chew on thereby providing some exercise for their teeth and easing the teething process as well.

More fruits like grapes (they absolutely love grapes), pomegranates, melons, cherries, berries, etc. and soft nuts like cashews, melon seeds, sesame seeds, sunflower hearts, etc. can now be offered to the kits. They can also be offered a variety of foods like bread, rice, corn, sprouts, cake, banana loaf, etc. It is important to keep low on artificial sugar though as it's not very healthy and they end up on a complete sugar rush! It is nevertheless important to let them be used to a varied diet so that they remain flexible enough to eat whatever they can find once they're on their own.

Quantity per feed: The quantity of the feed can be increased to 5 ml per feed.

Feeding frequency: The kits now require 4 feeds a day, 4 hours apart, with lots of titbits in-between.

Special care: The kits will now seek out warm places in the house like blankets, pillow cases, cushions, jackets, internet modems, etc. when they want to rest. Ensure to always check thoroughly and know where the kits are before you sit down.

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As the kits explore their surroundings and look for new spaces to get into and sleep, you can also hang a bag (preferably a cotton or canvas bag) close to their nesting box and they will likely prefer sleeping in the bag rather than returning to a box on the ground. Just leave adequate entrance space for them. The bag may be lined with a soft cotton towel. You can also leave them bits of wool or jute for them to carry back to their new 'nests' and line them up to their satisfaction. Refrain from hanging a bag if the kits still require a hot-water bottle at night – dependent on weather conditions.



Canvas bag for the kits

Example of feeding trays during and after weaning



Fresh foods tray



Dry foods tray

Week 7

The kits will play and play-fight a lot by this age. If hand-raising just one squirrel, it will be very important to spend a lot of play time with him/her as play-fighting hones their fighting abilities in the wild and is essential for their survival. If hand-raising more than one squirrel, they will play amongst themselves and require less attention from you.

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Relishing grapes



Offer a variety of foods

Feed: The milk content of the feed must now be reduced and the Cerelac (wheat based) content increased. As the milk content of their feed decreases, the addition of probiotics to their feed too can be reduced. Fresh food and water must be available for the kits at all times, and more foods like almonds, walnuts, peanuts (with/without shells), etc. must also be introduced.

Quantity per feed: The kits would now consume 5–7 ml per feed but larger feeds must not be encouraged. As their reliance on solid foods increases, the daily average of feed consumed by the kits can now be reduced. Ensure that the kits have some solid foods before their feed so they don't require a heavy feed. Kits that take longer to adjust to solid foods must be given an adequate feeds as it would negatively affect their growth otherwise.

Feeding frequency: The kits can now be brought down to 3 feeds a day – one feed each in the morning, afternoon and night. They will have their last meal much after sundown between 8-10 pm at night and can now be given a 10-12 hour gap between their feeds at night.

Special care: Although there will be no need for a hot-water bottle at night any longer, there must be ample amounts of warm bedding for the kits to keep warm.

Week 8



Inquisitive about the world outside



Interacting with animals outside

The kits now start adjusting to daylight hours and would prefer an uninterrupted sleep of about 12 hours at night. They might also now prefer spending a few hours at the window watching everything that goes on outside the house. This is a sign that the young are getting ready to explore the outside world. The kits will have achieved more than 70% of their total growth by the end of the 8th week.

Feed: Consider stopping additional milk altogether and give the kits a mix of Cerelac and egg yellow now. Cerelac contains about 35% milk and is more than adequate for the kits. The probiotics too can now be discontinued. The kits droppings, much like an adult squirrel's, would now consist of elongated black pellets.

Quantity per feed: The kits may be offered a feed of 5-7 ml each but the feed quantity must not be increased too much as the kits should now get most of their energy from solid foods. The feed must only be to supplement their diet and act as a means of offering solace rather than a purely dietary prerequisite for the young.

Feeding frequency: The kits can now be given 2 feeds a day – one feed each in the afternoon and late evening. It is important to refrain from giving the kits a feed in the morning as it encourages them to eat solid

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foods. You must ignore the kits initially if they seem to pester for a morning feed.

Special care: It is essential that the kits get plenty of exercise for good muscle development, co-ordination, gastro-intestinal tract functioning and learning. This must be encouraged by providing suitable play facilities for the young. Sunlight too plays an important factor in the development of the young and lack of the same can result in rickets.

Habitat enrichment

It is extremely important to start providing enrichment for the kits by the time they reach two months of age. The kits are extremely curious at this age and require supplementary stimulation to maintain their curiosity. This may simply be achieved by shifting things around a little bit so the kits always have something to explore.

Hanging or hiding their food also helps as they will learn to search for their food. The food may be shifted around, giving them the opportunity and need to explore further.

This process is vital for squirrels being released through a hard release process as squirrels under a soft release will have adequate stimulation once they are allowed to roam outside.



**Strings of food as
habitat enrichment**

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2 – 3 months

Young squirrels get their adult coats which are darker, thicker, and very sleek, by 2½–3 months of age. It is interesting to note that some squirrels also get a linear marking on their foreheads at this age. This marking seems to disappear in a few weeks by the time they attain their full growth. The squirrels also get their complete set of adult teeth by 12–13 weeks of age. The kits would now have completely adjusted to being active during daylight hours, i.e., up by sunrise and back in bed by sunset. The process of rehabilitation and soft release begins at this age.



Linear marking on the forehead



Adult coat



Exploring trees

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Feed: A feed of Cerelac along with vitamin drops and gripe water would now suffice the kits nutritional needs. They could also be offered their bedtime feed in a small saucer as the quantity of feed doesn't need to be monitored strictly anymore. This is also an ideal time to start breaking off contact with the young. Ceasing to hand-feed facilitates this process.



Kits feeding on their own

Squirrels are opportunistic feeders and will now begin to explore a variety of foods including leaves, buds, flowers, grasses, berries, etc. Their diet in the wild also occasionally includes insects and bird's eggs and chicks.

Quantity per feed: The kits would now need a feed of 7–8ml but they must be allowed to have a tummy-full should they ask for more.

Feeding frequency: The kits only need their bed-time feed now, preferably late in the evening, i.e., around or a little after sunset. This ensures that the kits are tempted to eat during the day but don't go to bed on an empty stomach at night. The feeds can be completely stopped by 10-11 weeks of age.

Special care: The kits must be allowed to roam outside the room/enclosure where it is feasible. An access door or window can be left open for the kits to freely move in and out of the room/enclosure. The kits must never be allowed access to other rooms of the house as it is

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extremely dangerous for them. Their playground must always be outside the house. They must only be let out for a few, strictly supervised hours initially to ensure their safety from predators. They will gradually start staying away for longer durations.

Most animals show remarkable site fidelity and homing instincts. Animals released at new sites typically attempt to return to the place they have grown up in. This journey towards 'home' results in their taking higher risks that often have fatal consequences. The kits must ideally be given the opportunity to familiarize and associate themselves with the environment they will subsequently be released in. The cage or enclosure must therefore be placed at the site of release to encourage the kits to get familiar with the new environment, thereby assisting safe release.

3 – 4 months onwards

The squirrels will now be away most day and only return for quick snacks during the day and to sleep at night. As their confidence increases, they will slowly expand their range and wander further away from their room and enclosure. By 4 months of age, they would stop returning at night but may still drop by occasionally during the day.



Box with bedding inside



Indian palm squirrel adult

Special care: Being primarily arboreal in nature, the palm squirrels instinctively prefer to sleep in spaces at a height. Retiring in enclosed spaces higher up in trees or eaves of houses affords them safety from terrestrial predators. Consider hanging a box or even a bag somewhere

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high up in the room by the time the kits are 3 months old. For e.g., hang a cardboard box behind some curtains so they can climb up the curtains and get some privacy too. Depending upon the season, a warm blanket or towel may be placed inside the bag or box for bedding.

Release



Soft release process

Soft Release is a means by which an animal is gradually introduced or familiarized to a new environment before its eventual release into that location.

Hard Release is a means by which an animal is released into a new location without its being accustomed or familiarized with the new environment. Squirrels that have been rescued as adults are able to cope better with a hard release as they have already learnt all the skills necessary for their survival.

It is ideal to opt for a soft release for hand-raised young. Hand-raised young have to learn all new skills through a method of 'trial and error' as they have no adults to teach or show them the essential survival skills by way of example. They also have to offset the effects of imprinting and hence require more time and protection before they are completely independent. A soft release, which permits them to return to security until they are ready for complete independence, thus maximizes their chances of survival.

The young must always whenever possible, be released in their natural environments, at or close to the location of rescue. This not only maximizes the animal's survival but also keeps a check on the contrived spread of parasites, diseases and genetic materials within wild populations. Forest species must only be released in suitable forested locations where the species naturally occurs.

N.B. Once the process of acclimatization and release begins and the squirrels start interacting with wild squirrels outside, they must be handled carefully. Avoid startling them as they may instinctively bite.

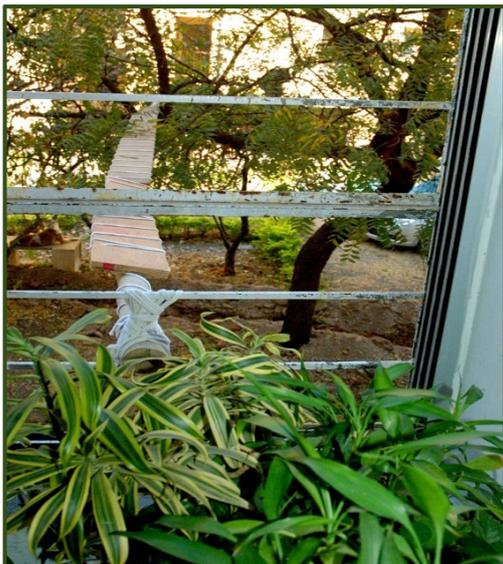
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Soft Release – allowing access

An access door or window to the enclosure can be left open for the squirrels. The access door should be slightly bigger than the squirrels to allow easy and comfortable movement through it. Preferably, the opening shouldn't be too big so as to prevent access to larger predators. Wherever possible, the opening should take the squirrels onto higher ground to facilitate escape from terrestrial predators in case of a sudden threat. Windows are therefore preferable to doors for this purpose.

To provide outdoor access for the young from an apartment, a makeshift ramp may be used to connect the window to a tree outside. This is extremely effective for a soft release. The ramp can be made of wooden planks or by twining rope around a piece of bamboo and must be secured firmly so it doesn't dislodge accidentally. The surface of the ramp mustn't be smooth or slippery. The squirrels use the ramp with ease and play in the garden and return home when they need to. This is extremely helpful for enhancing their motor skills and boosting their agility.

The ramp is not recommended as a safe option for apartments higher than the first floor as young squirrels in the initial stages of their exploration and excitement, sometimes fall off the ramp.



Connecting ramp



Squirrels using the ramp

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The kits must always have access to a safe area to return to when they are threatened as there will be many predators like cats, dogs, *shikras* (small hawks), crows, snakes, etc. that can threaten a young squirrel. When leaving an access window/door open for the squirrels, especially from an outdoor enclosure, it is extremely important to shut the access after sunset to prevent access to nocturnal predators. The access door must be reopened at sunrise for the squirrels to be let out again.

The enclosure can be closed or shifted out by the time the kits are 4 to 4 ½ months of age. The kits are independent enough to survive on their own by this age. Additionally, temporary nest boxes can be placed in the vicinity of release as a place for the squirrels to return to until they find a more permanent space.

Soft release from an apartment building

Young squirrels may be released from apartment buildings too. It is not uncommon to find squirrels scaling the walls of rough-surfaced buildings. In fact, squirrels in some apartment colonies have little access to tress, but live on buildings, nest above windows and/or ACs and thrive on the mercy of food provided by kind people.



Example of a rough surfaced wall

The main considerations to be kept in mind when releasing the squirrels from apartment buildings is,

1. The texture of the outer surface of the building

It goes without saying that such an option is only available to people whose apartment buildings are rough-surfaced on the outside. This is definitely not a perfect option but a good indication of whether or not

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your buildings is suitable for squirrels would be the presence of wild squirrels in and around your building. In all cases, you would not want to release your squirrel in an environment where it is the only one.

2. The age of the squirrels during release

Another primary consideration to be kept in mind is that it is not safe or easy to run on vertical surfaces that don't provide adequate footing and it takes a lot of agility and practice from even an adult squirrel so it doesn't fall off. Young squirrels are yet to acquire this agility and sense of balance before expecting them to confidently scale buildings. In my experience and understanding, if opting for such a release, the young squirrel must be at least 2 ½–3 months of age before allowing it to run on the outside walls.

3. Marking the exits/access for safe return

Lastly, you must remember that all apartments in a building look exactly the same from the outside. Once outside, it is difficult for the squirrels to locate YOUR balcony or window and return home. Often, the squirrels get confused and end up at somebody else's place. If you have ever been lost in a new and unfamiliar housing complex, with no markings or directions whatsoever, you will know what I am making a reference to.



An apartment building – everything looks the same

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It is imperative here to mark your balcony or access opening and let the squirrel familiarize itself with the marking for at least a week or two before permitting it to play outside. The marking, for example a bed sheet or netlon, must be tied outside and preferably protruding from the balcony so it can be easily spotted from a distance when on the building. Although this isn't perfect science, we have found it extremely helpful in previous experiences.



Marking balconies for easy recognition

Tips for a hard release



A hard release can ideally be carried out when the young are 4 months old. The release site must be chosen beforehand to ensure there are ample fruit/seed trees in its vicinity. It is imperative to choose a site with no apparent predators. The squirrels must not be released close to any major roads, water bodies or any other perceivable threats.

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The young must be released on a clear and sunny day. Special care needs to be taken during the monsoons. The young must be released during a dry spell even if it takes a few extra days.

The kits should be released immediately after their breakfast so they can devote all their energy in exploring the new place rather than worrying about food. If not, they must be released first thing in the morning. The kits will require time to explore the new territory and find a safe shelter for themselves. They must never be released into new territories any later than midday especially in winter due to shorter daylight hours.



Taking shelter from the rain



Basking

Territoriality

Territoriality, though rarely observed in palm squirrels, is often dependent upon the availability of resources. Although some adults do display territorial behaviour, they are rarely viciously aggressive towards other squirrels.

Letting go

One of the most challenging aspects of being a rehabilitator or any foster parent is letting go of the young when they are ready for release. Even though this is primarily out of a concern for their safety and well-being, it is important to realize and suitably respond to the young one's needs. The young must be released at the right time as their mind and bodies

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are best suited for adapting to novel environments and surroundings at that age. Once they are past that age, they too become set in their ways and needs and find it very difficult to adapt to their natural surroundings.

Wild animals do not make good pets. They have an innate need for freedom and exploration that cannot be placated by offering them the security of a safe, sheltered and comfortable lifestyle. This need is most pronounced when the young mature sexually. There isn't a sorer sight than watching a wild animal pacing in an enclosure or sitting endlessly beside a window and staring at the myriad opportunities that await him/her outside. Moreover, there is no greater joy than watching your very own hand-raised young be happy and free outside, and return periodically for tit-bits or to just say hello!

A lil' word of thanks!

This handbook is dedicated to **Zoe**, the craziest squirrel I've ever known!
My life has been enriched for having known you and cared for you.



Zo... at her best!

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"Debby, my first love and best friend, your absence is felt every single day of my life!"

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