Ten Common Causes of Stool Problems in Juvenile Squirrels

Shirley Casey

Many rehabilitators express concern about stool problems in young squirrels. But before describing specific problems, it's good to focus what's normal. Juvenile squirrels that are consuming milk replacement formula tend to have small, round, firm, gold-colored pellets. Juveniles or adult squirrels eating solids have round, firm, dark brown or black stool (see photo). Healthy squirrel stool generally has little odor.

In addition to stool, the growth rate can give clues to digestion. While younger tree squirrels may gain 1-2 grams a day, juveniles with their eyes open should be gaining 3-5 grams per day. If they do not gain at this average rate, identify the reasons, such as intestinal parasites or inadequate nutrition, and address the problem promptly.

Also, consider the difference between diarrhea and soft stool. Diarrhea is liquid, watery stool, with few if any formed solids. It often has a strong odor and is involuntary. Soft stool is softer than normal and either formed or pasty. It tends to be sticky, lighter in color, and have more odor than normal. If a squirrel develops soft stool, prompt action to identify the problem can prevent the stool from progressing into diarrhea.

Overfeeding

Many squirrels are enthusiastic eaters and will overeat. Until squirrels are close to weaning age, their stomach capacities can comfortably and effectively handle about 5% of their body weight in formula per feeding. Giving those juvenile squirrels more than the 5% at a feeding will likely result in overfeeding – and they will often develop soft stool or diarrhea.

If the squirrel's stool becomes sticky, soft, and lighter yellow, overfeeding may be the reason. Weigh the squirrel every couple of days with an accurate gram scale to confirm the amount that should be fed. Ensure all caregivers feed the appropriate amount.

Juvenile squirrels that are closer to weaning (e.g., climbing well, jumping accurately, hanging from top of cage) can digest a volume of 6-7% of their body weight in formula per feeding. They may develop soft stool if fed more than that amount. If this happens, consider reducing the amount.

Overfeeding also can occur when squirrels are fed too frequently, which can be too often in a day or when the feedings are too close together. Ideally the squirrels should have time to digest most of their previous meal before being fed again. Check the frequency of feeding to ensure they are getting enough meals, but not too many. If feeding frequency seems to be the problem, decrease by a single feeding to see if the problem resolves.

Calculating 5% of Body Weight

For a squirrel weighing 100 grams, multiply 100 x .05 to arrive at 5 cc's. (An easy way to check your math is to take the 5 cc's, double it, and multiply by 10 to get the original 100 grams.)

Making changes

The composition of the milk provided by lactating mothers changes gradually over lactation: not drastically over a couple of feedings. When the diet for juvenile squirrels is changed significantly over a very short time, stool problems may result. Add new items to the diet gradually and one at a time. If problems occur, remove the new item and introduce it much slower the next time – or do not add it at all.

Adding new items to the diet or making other diet changes (e.g., increasing the fats) when the squirrel's stool has not been normal for several days can cause a small concern to worsen.

Rapid and large increases in the amount of formula or other food may cause stool problems even though they were previously been tolerated in small amounts.

Overly rich diet

Giving squirrels diets that are too rich in fats can result in diarrhea. Squirrels with their eyes open and that have normal stool may benefit from additional fats added to their milk replacement formula (e.g., Esbilac®) that are easily digestible, such as Multimilk™ or whipping cream.

Infant squirrels cannot digest the same level of fats that older juvenile squirrels need, so it is important to not add extra fats (e.g., whipping cream, Multimilk™) until the squirrel is over 3 weeks of age. A general rule of thumb is to not add extra fats such as whipping cream or Multimilk™ until the squirrel has fur on its abdomen – and then to very gradually add fats (i.e., beginning with a tiny amount and increasing to ¼ part over several days).

Endoparasites

Squirrels are hosts to many different endoparasites. For example, squirrels commonly have coccidia, an endoparasite, in their GI tract and do not experience problems. However, an overgrowth of coccidia can occur if the squirrel is under stress from capture, injury, or captivity. They may alternate normal stool one day with soft, yellow stool the next. Squirrels with coccidia also may have slower growth rates but stool that appears normal. Coccidia does not always show up on a fecal exam. It is easily treated with Albon®.

Giardia, another endoparasite, may cause squirrels to develop diarrhea that has green tints, mucus, and a strong odor. Squirrels with giardia also tend to have slower growth rates. Giardia has been treated with Metronidazole, Panacur, or other products.

Both coccidia and giardia can be transmitted easily to other squirrels. Following initial quarantine protocols can help prevent other squirrels from getting endoparasites and developing stool problems.

Improper storage

Commercial milk replacement powders need to be refrigerated or frozen until mixed and used. After the milk replacer powder is prepared into formula, it should be either used immediately or kept refrigerated for less than 24 hours. The formula should be warmed to a little warmer than body temperature before feeding the juvenile squirrels that are also warm. Warmed formula should never be chilled and then reheated. Spoiled food can cause stool problems.

Improper mixing

Inaccurate measurements can result in formula that has inappropriate proportions and can cause digestive upset. Strive for accurate and consistent measurements.

Commercial milk replacers are formulated to be mixed with water, and sometimes supplements such as Multimilk™. Mixing commercial milk replacers with other products that include sodium, such as Lactated Ringer Solution, Normasol R®, and Pedialyte®, will increase the sodium level of the formula, which can pull fluids from the intestines and result in more water in the stool, and begin to dehydrate the animal.

Stress

Squirrels, like other species, can develop soft stool due to stress. Squirrels have very sensitive hearing, so noises that might not seem loud to humans may be major stressors, including conversation, ringing telephones, rattling cages, and other animals (e.g., loud baby birds). Since squirrels have an acute sense of smell, strong odors from cleaning agents, perfumed soaps or lotions, scented laundry detergent on bedding, or even the smells of urine in dirty cages can be stressors. Movement and activity by humans or other animals can be stressors, as well as proximity to predators. Minimize stressors.

Unbalanced gut flora

A normal, healthy GI tract has a variety of healthy resident bacteria that support digestion. If the squirrel is on antibiotics or has had watery stool, the good gut bacteria may be off-balance or absent. Consider supplementing or replenishing with probiotics or an inoculant made from the stool of a healthy adult squirrel that has been confirmed parasite free. Probiotics are only provided twice a day.

Providing food or formula when dehydrated

In many cases, juvenile squirrels will be admitted to rehabilitation with mild or moderate dehydration. An animal must be fully hydrated to digest and absorb nutrients in formula or other foods. Thus, feeding a juvenile squirrel formula or solids before it is hydrated can result in stool problems – and possibly result in further dehydration.

Generally, the first step is to provide one or two of feedings of isotonic fluid (i.e., Lactated Ringer Solution or Normasol R). Following this, gradually increase the concentration of the formula up to normal levels (e.g., begin with a feeding or two of 1 part Esbilac® combined with 4 parts water; then 1 part Esbilac® with 3½; 3; 2½; and finally 2 parts water). Experienced squirrel rehabilitators report that juvenile squirrels often can and need to be on full strength formula within about 24 hours after admit to rehabilitation, especially infants.

Inadequate diet

Using an effective and proven commercially available milk replacement product and high quality rodent chow can prevent many digestive and nutritionally based disorders. If you suspect the formula might be the problem, check reputable sources and talk with experienced rehabilitators who raise healthy squirrels with consistently good growth rates, healthy digestion, and good stool. Ask detailed questions about the formula they use; results (e.g., growth rate, activity, fur); frequency and type of problems; the number of squirrels they've rehabilitated; etc.

Fruits, vegetables, nuts, and seeds also may cause digestive difficulties, whether due to being a food that squirrels would not eat in the wild (e.g., lettuce, tomatoes, oranges) or too much of something they might opportunistically eat (e.g., strawberries, raspberries, pecans). Diarrhea can be caused by a rescuer feeding a squirrel a wrong diet, such as cow's milk.

If it appears that the diet caused the problem, remove the potential cause and introduce an appropriate diet. This may mean starting with dilute formula and building up to full strength formula over 24-48 hours as the squirrel's stool improves as described earlier.

Using a quality diet is essential. While some diet problems may show up immediately as stool problems, in other cases the consequences of poor diets may not show up until weeks or months later.

Conclusion

These are a few of the things that can cause squirrels to have stool problems. There are certainly more, including ingredients of the formula, injuries, parasites and viruses. Many others are a result of general husbandry and rehabilitation practices that may be quickly and fairly easily resolved by adjusting rehabilitation practices – and not requiring medications.

Resources

Aiello, Susan and Asa Mays, editors. 1998. *Merck Veterinary Manual, 8th Edition*. Merck and Company, Whitehouse Station, NJ.

Casey, Shirley and Allan Casey. 2003. *Squirrel Rehabilitation Handbook*. WildAgain Wildlife Rehabilitation, Inc., Evergreen, CO.

Casey, Shirley and Mackenzie Goldthwait. 2003. "Gastrointestinal conditions in squirrels: the scoop on poop." *Squirrel Rehabilitation Handbook*. WildAgain Wildlife Rehabilitation, Evergreen, CO.

Fosco, Lisa. 2005. Personal conversation.

Moore, Adele and Joosten, Sally. 2002. *NWRA Principles of Wildlife Rehabilitation, 2nd Edition*. NWRA, St. Cloud, MN.

Shirley Casey has been a licensed rehabilitator since 1986 and rehabilitated 18 species of squirrels. She is co-founder of WildAgain Wildlife Rehabilitation in Colorado and co-author of the Squirrel Rehabilitation Handbook available at www.Ewildagain.org.