

## **‘New’ Esbilac® Powder and Juvenile Wild Mammal Formulas Update October 15, 2009**

WildAgain Wildlife Rehabilitation continues to collect information regarding the ‘new’ Esbilac® powder manufactured after December, 2008. As with our other research projects, we try to provide information to the wildlife rehabilitation community that will support rehabilitators and their veterinarians in their decisions and practices.

### **Key information in this update:**

- Mixed results of using the ‘new’ Esbilac® continue
- Possible causes of the gastrointestinal problems
- Culture sensitivity tests and necropsy results
- Preliminary results of lab tests on Esbilac® powder
- PetAg says Esbilac® is for puppies and to use Zoologic® Milk Matrix for wildlife
- Comments on KMR® and Zoologic® Milk Matrix 33/40
- Results of treatments
- Recommendations

### **Results from using the new Esbilac® powder**

Positive results: Some rehabilitators making formulas for juvenile wild mammals with the ‘new’ Esbilac® powder by adding extra fats (whipping cream, Multi-Milk™, etc.) to achieve a closer match to the species’ nutritional needs report that the animals seem to have normal gastrointestinal function, growth and development.

Other rehabilitators report the animals that had health and growth problems when using the ‘new’ Esbilac® powder recover when switched to a new milk replacer and seem to be developing normally.

Continuing problems: Some rehabilitators reported that a small number of the juvenile squirrels fed formula made with the new Esbilac® powder and extra fats still developed or continued to have gastrointestinal problems.

A few rehabilitators continued to see severe health problems, delayed growth, and fatalities even 5 weeks after the juvenile squirrels were taken off formulas made with the ‘new’ Esbilac® powder and placed on new milk replacement products.

### **Diarrhea -- Identifying possible influences**

Juvenile squirrels tended to have more diarrhea and more difficulty developing normal stool and growing that 1.) were younger (e.g., eyes still closed), 2.) had more health problems when presented for rehabilitation, 3.) fed the ‘new’ Esbilac® without fats for a longer time, and/or 4.) fed a more dilute formula for over 48 hours. The more of these factors were involved, the higher the likelihood of their developing *green* diarrhea.

It was reported that rehabilitators who fed formula made with the ‘new’ Esbilac® and extra fats as well probiotics were less likely to develop gastrointestinal problems.

## **Inconsistent results when adjusting proven recipes using the 'new' Esbilac®**

Rehabilitators have been using WildAgain's Nutrition Calculator to identify and begin assessing possible 'recipes' that could more closely match the numerical values of the squirrels' nutritional needs, as well as the nutrition analysis from the Esbilac® made prior to December, 2008 that had been effective for many years.

A few rehabilitators had been feeding a 'recipe' of 1 part 'new' Esbilac®, 1/3 part Multi-Milk™ and 2½ parts water. Their squirrels did not have stool problems and appeared to be growing normally. However, it seemed that increasing slightly to 1.2 parts of Esbilac® powder, adding the extra fats, and using 2 parts water would be closer to the formulation of Esbilac® made prior to December, 2008. Those rehabilitators trying this have reported juvenile squirrels developing green diarrhea within two days. Changing them back to the prior 'recipe' did not stop the diarrhea. Culture sensitivities showed that the squirrels had massive infections of several different types of bacteria that were antibiotic resistant. More on that later.

## **Causes of the green diarrhea**

The green diarrhea in squirrels may be caused by various factors. Three of the more likely causes of green diarrhea include giardia, inadequate nutrition, and infection. Most of the squirrels with the green diarrhea that were tested for giardia had negative results. Some of the squirrels still were placed on Panacur™ or Flagyl™ in case it was giardia. Since they still did not improve, it was not believed to be giardia.

Green diarrhea that is the result of inadequate nutrition may be described as 'starvation stools.' Those green 'starvation stools' should quickly return to normal color when an adequate diet is provided (product, amount, frequency, etc.). Some of the squirrels' stools did normalize shortly after the animals were placed on formula that more fully met the squirrel's nutritional needs than the 'new' Esbilac® mixed with just water. These different diets included Zoologic® Milk Matrix 33/40 plus extra fats, Fox Valley Nutrition's Squirrel Milk Replacer (32/40) and even the 'new' Esbilac® supplemented with extra fats. Unfortunately, many squirrels continued to have the green diarrhea, slow growth and other health problems that did not improve even after they were placed on these diets.

Infections are another possible cause of green diarrhea in squirrels. Some veterinarians prescribed antibiotics for the squirrels with diarrhea. Confusion and anxiety about possible causes grew when the squirrels still did not improve when given antibiotics. A few veterinarians then conducted fecal culture sensitivities to identify if the problem was related to infection and, if so, which antibiotics could be effective in treating them.

## **Culture sensitivity and necropsy results**

Rehabilitators and veterinarians in Ohio, Florida, and two California locations have provided WildAgain with copies of the fecal tests conducted for juvenile squirrels with

'slimy' green diarrhea that started after feeding formula made with the 'new' Esbilac® powder, even with the addition of the extra fats.

Fecal culture sensitivities of juvenile squirrels that continued to have gastrointestinal problems and slow growth revealed the presence of elevated and often massive levels of bacteria. Some necropsies showed enlarged and damaged livers and kidneys, and thickened intestines. Some necropsies showed signs of pneumonia and metabolic bone disease.

To date, seven of the tests were from culture sensitivities and six were as a result of necropsies. Several other veterinarians that examined slides with fecal matter from the squirrels with diarrhea have reported excessive amounts of rod-shaped bacteria in the squirrel stool that indicated infections even though they did not conduct culture sensitivities. More test results are expected shortly.

The test results indicated expected bacteria that are commonly present and essential in the normal gastrointestinal tract of many species of mammals. However, the levels of these bacteria far exceeded the normal levels found in a healthy animal – which may cause or contribute to severe diarrhea.

The bacteria identified in the majority of tests reported to WildAgain prior to October 14, 2009 included massive levels of both *Escherichia coli* (*E.coli*) and *Klebsiella pneumoniae* (*Klebsiella p.*). Some also had *Salmonella*, *Staph simulans*, and *Strep agalactiae*. In addition, some tests showed the protozoan *Cryptosporidium*.

The ***bacteria tested in these fecal culture sensitivities were highly resistant to most antibiotics*** – which helps explain why common antibiotics did not help those sick squirrels. For example, six of the culture sensitivities conducted in Ohio showed that the bacteria were only sensitive to the antibiotic Chloramphenicol. The rehabilitators carefully administered this medication that has high risks for people handling it – and their juvenile squirrels recovered quickly and completely. One of the culture sensitivities from California was resistant to antibiotics except a couple that are highly restricted for human use.

#### Arranging for fecal culture sensitivities

Veterinarians can send a fecal sample to a laboratory for culture sensitivities to identify bacteria and the antibiotics to which they are sensitive. These tests often exceed \$100.

Another option is for the rehabilitator to send a fecal sample directly to the independent labs. This saves the veterinarian time and is less expensive for the rehabilitator. These tests may cost less than \$50 per culture sensitivity per animal if the rehabilitator sends them directly to a lab.

Rehabilitators who want to arrange for fecal culture and sensitivities should contact the lab directly for costs, processes, labeling, restrictions, where and how to send the samples, payments, timing, etc. before sending samples. There are a variety of labs from which to choose. Antech (800-745-4725) is a company that has provided reliable results for rehabilitators.

The process generally involves placing some of the fecal matter in a culturette (available from medical supply companies) and shipping it to the lab. Coat the tip of the culturette swab in a sample of the stool. Be careful not to touch or contaminate the specimen or swab. Indicate the type of animal (e.g., rodent, rabbit). Select Aerobic Culture and Sensitivity. Some people prefer to leave a blank space for the source (i.e., feces) since that may result in the lab testing for more types of organisms.

Consult with your veterinarian about the interpretation of results and possible treatment options.

## Negative effects resulting from the infections

*E.coli* and *Klebsiella p.*, and the other bacteria found in the culture sensitivities may cause diarrhea, kidney conditions, pneumonia, fever, dehydration, sepsis, neurological conditions, slow growth, and more. *Klebsiella p.* is considered to be an opportunistic pathogen meaning that under certain conditions it may cause disease. For example, people who are hospitalized or animals in rehabilitation, may develop *Klebsiella p.* because they are in a weakened condition or have compromised immune system.

The more severe problems in humans are most likely to occur in younger children and in adults with weakened immune systems. As mentioned earlier, squirrels that were younger and had more health problems seemed to have more difficulty. Add these to the inadequate nutrition that the animals were receiving and the problem of antibiotic resistance, and it becomes more clear why some of the animals were seriously ill, had difficulty recovering, and possibly died.

### Zoonotic risks

It is important to note that **these bacteria are contagious to animals and people, particularly those whose health is compromised for any reason.**

Rehabilitators know that they should follow careful quarantine and sanitation protocols with wildlife, and be especially careful when animals are ill. However, these practices may lax when people are especially busy, tired, or working with animals requiring extensive care or close together. It is **absolutely critical that strict quarantine and sanitation protocols be followed** with these cases in order to reduce the risk of transmitting diseases and parasites to people and animals!

## Why are so many infections developing?

It is not unusual for animals with diarrhea that lasts more than a week to develop a variety of problems, regardless of what caused the diarrhea. The intestines are likely to become very inflamed and may hemorrhage. The animals may have difficulty maintaining proper hydration levels due to fluid loss and problems absorbing fluid. The animals may lose weight, have little energy, and be uncomfortable or painful. The beneficial bacteria in the intestine can be flushed out with the diarrhea, resulting in an overgrowth of unhealthy bacteria. These animals with diarrhea may then develop secondary infections or opportunistic primary infections due to their compromised state. Such infections may remain present in the gastrointestinal system, or they may move to other areas, such as the kidneys, respiratory system, neurological system, and so forth.

Thus, the lingering diarrhea, persistent dehydration, and variety of other health problems reported in some of the juvenile squirrels could be directly or indirectly related to infections that developed due to the diarrhea after they were fed formula made with the 'new' Esbilac® powder.

It is also possible that the juvenile wild animals' immune systems were somehow compromised, including possibly by the 'new' Esbilac® powder, and that the infections occurred as a result. The squirrels that had normal stool and were growing on the 1 part 'new' Esbilac® powder that developed diarrhea with massive levels of bacteria when the 'new' Esbilac® was increased slightly to 1.2 parts prompts this type of question.

While it does appear that juvenile squirrels and some other juvenile wild mammals have developed infections after being fed the 'new' Esbilac® without extra fats, it is still inconclusive as to whether these were primary or secondary infections.

### **Independent laboratory tests on the Esbilac® powder**

Government agencies and independent laboratories, as well as PetAg, the manufacturer, are conducting a variety of tests on the 'new' Esbilac® powder. The laboratories are testing the Esbilac® powder to determine if the ingredients meet the guaranteed nutritional analysis, presence or absence of toxins or contaminants, and more.

Several rehabilitators have reported that independent laboratories are testing the Esbilac® powder. WildAgain is currently collecting results from several tests on the different lot numbers as tested by multiple independent laboratories, including control samples from Esbilac® made prior to PetAg's change to the single step dry process in December, 2008. Since the preliminary results show considerable variation in fats, proteins, fiber and heavy metals, WildAgain is collecting more information on the types of tests (i.e., acid hydrolysis versus ether extract) and their reliability before reporting specific results.

To WildAgain's knowledge, federal and state tests are still incomplete.

### **Questions about fiber and copper**

Some rehabilitators have wondered about the possibility of contaminants in the 'new' Esbilac®. According to a wildlife veterinarian, tests conducted on the new Esbilac® powder by the University of California – Davis indicated that no heavy metals were detected. However, a rehabilitator who contracted with an independent laboratory to conduct tests on the 'new' Esbilac® powder posted results on her website that described elevated levels of copper as well as fiber.

PetAg responded to the comment about copper in an email that covers a variety of issues:

[http://www.indybay.org/newsitems/2009/09/27/18623489.php?show\\_comments=1#18624660](http://www.indybay.org/newsitems/2009/09/27/18623489.php?show_comments=1#18624660)).

PetAg wrote: "Esbilac® is a puppy milk replacer formulated to meet the nutritional needs of growing dogs. ... Certain micro minerals such as copper are a vital part of an animal's health. This includes maintaining a healthy heart and liver, developing bone strength, brain development, supplying energy to the cells and maintaining a healthy immune system. Levels of copper supplied in the formula are for optimum utilization by growing dogs. It must be remembered that other sources of copper may be found in water which should not cause a problem unless the copper in the water is excessive.

Esbilac®, milk replacer for puppies, is a milk product and thus does not contain fiber. ... It is important when performing laboratory analysis on a milk based product to use the appropriate methods for determining protein, fat and fiber. If the methods used are not appropriate for milk products the results obtained may be erroneous. .... PetAg, Inc. has

strict guidelines for the testing of its products which includes not only nutritional guarantees, but also microbiological tests to provide assurance that the product is pathogen free and meets the standards for human consumption from the microbiological aspect.

Esbilac® Results (from the 6 most recent tests, all conducted by independent registered national labs)

Protein—34.0%

Fat---40.37%

Fiber---0.25%

Copper---12.52 ppm maximum allowable limits on dry feed 250 ppm”

The above email from PetAg stated that the Esbilac® results were from the 6 most recent tests, but does not indicate whether or not that the results were for multiple tests on a single lot number, or even performed on the ‘new’ Esbilac®. PetAg staff told WildAgain that they would no longer publish a revised Typical Nutritional Analysis of the ‘new’ Esbilac® dried with the single step manufacturing process until they had manufactured 6 lots – and that as of August, 2009 they had made only 4 lots with the new process (lot numbers 3528E, 0919E, 0929E, 1639E). PetAg has not yet responded to an inquiry about which lots were tested. In addition, the PetAg statement about allowable level of copper refers to dry feed, not a product that is made into formula.

According to PetAg, tests on the ingredients or contaminant analysis (bacteria, metals, toxins, etc.) have not yet been conducted on samples of the ‘new’ Esbilac® that were returned to them by several rehabilitators. It is uncertain when those tests will be conducted, and if or when they will make the results available.

### **PetAg says Esbilac® is for puppies, not wildlife**

Earlier in October, PetAg placed an announcement on their website, PetAg.com, that said “Esbilac® powder is formulated to feed neonatal puppies. The suggested formula for wildlife and exotic animals would be Zoologic® Milk Matrix 33/40, or other products in the Milk Matrix line.” This is an interesting development since PetAg has sold Esbilac® to rehabilitators for use with wildlife for years. PetAg has subsequently removed this announcement from their website.

### **KMR®, another PetAg product**

Also in early October, PetAg, via their website, announced that, “Recently, a limited number of KMR® powder users have experienced product producing an off odor. Normally, the product exhibits a faint “milky” smell. It has been determined that some packaged KMR® powder may have been exposed to excessive heat outside the manufacturing process. Do not use the product if it has an off odor.”

While PetAg wrote that they will replace KMR® powder that has a bad odor, their response is uncertain if the customer wants the product replaced or their money refunded if the product does not have a bad odor. PetAg has subsequently removed this announcement from their website as well.

That said, people feeding formula made with KMR® powder to kittens have reported that some kittens have gotten ill even when the KMR® powder did *not* have a bad odor. Rabbit and raccoon rehabilitators have reported that some of the animals in rehabilitation this spring and summer also have developed severe gastrointestinal problems after eating formula made with KMR® powder even without a bad odor.

In response to WildAgain questions, PetAg acknowledged that the first batch of the KMR® powder using the single step drying process could be available for sale in November, 2009. Similar to the modification in the Esbilac® powder manufacturing process and move to a new manufacturing facility in December, 2008, PetAg says the change will help enhance 'product stability'. While PetAg says they do not expect consumers to notice differences in the product, they had said the same about the 'new' Esbilac® powder. Time will tell if and how the revised drying process affects the KMR® and the animals to which it is fed.

WildAgain will continue to collect information on the status of KMR® and provide updates on this website. Rehabilitators can email information on KMR® powder to [wrehabproject@me.com](mailto:wrehabproject@me.com).

### **Zoologic® Milk Matrix 33/40**

Some rehabilitators have begun feeding formula made with Zoologic® Milk Matrix 33/40 to their orphaned squirrels instead of Esbilac®. This is the 'original' Esbilac® formulation made with vegetable fats that was sold under the Esbilac® name prior to 1993. Most rehabilitators who have contacted WildAgain about Zoologic® Milk Matrix 33/40 have said they are adding the additional fats to meet the nutritional needs, and their animals seem healthy and to be growing normally.

That said, in 2007, bat rehabilitators across the US reported a variety of health problems when they used Zoologic® Milk Matrix 33/40. Bat World Sanctuary commissioned independent laboratories in four states to analyze milk replacement formula for bat pups made from Zoologic® Milk Matrix 33/40. Bat World Sanctuary reported the results of the tests conducted at those four independent laboratories in 2007 had different nutrient levels and heavy metals from what PetAg represented was in the Zoologic® Milk Matrix 33/40. Visit their website for more information and copies of the 2007 reports ([www.batworld.org](http://www.batworld.org)).

No routine product tests of the Zoologic® Milk Matrix 33/40 conducted in 2009 have been made available to WildAgain except the Typical Nutritional Analysis provided by PetAg that has not changed in years.

### **Treating the infections – Conventional and alternative treatments**

Rehabilitators and their veterinarians have continued to try to resolve the lingering infections and other health problems in the juvenile squirrels. Some have seen recoveries from the infections when they successfully find an antibiotic that works on the problematic bacteria. Other rehabilitators and veterinarians have turned to various complementary and alternative medicines to deal with infections that are highly resistant

to antibiotics. For example, some rehabilitators report recoveries after substantially increasing the amount of liquid probiotics provided with an effective milk replacement formula.

A few reported that squirrels improved after they used herbal medicines that are effective with gastrointestinal infections, such as Goldenseal tincture, Slippery elm tincture, and ingestible Aloe gel. Others reported that the squirrels that had the 'yellowish' and 'yellowish green' diarrhea improved rapidly after being given both the ingestible Aloe and liquid probiotics. A short article on the use of ingestible Aloe for gastrointestinal infections is available. An article on probiotics will be available shortly.

Some have reported recoveries after selecting and using homeopathic remedies that match the specific symptoms according to homeopathic principles, as well as providing the liquid probiotics with an appropriate milk replacer formula. Results of other treatments, such as Collidal Silver, Chinese herbs, and acupuncture, have not yet been reported.

A new article on various treatment options for squirrels with stool issues is being developed.

### **More recommendations**

As always, anyone working with wildlife needs to stay alert to the possibility of diseases and parasites for animals and people. As mentioned earlier, some of the infections related to the gastrointestinal problems may be contagious to animals and people. Effective hygiene and sanitation protocols are essential. Regularly clean cages, bedding, water bowls or bottles, cage contents, etc. with products that are effective against microorganisms and parasites. Wear gloves, especially when handling animals that are ill or may have transmittable health conditions. Disinfect feeding utensils and containers. If rehabilitators or their volunteers develop health problems that could even *possibly* be related to a wildlife disease, they should immediately contact their health care provider.

Follow effective quarantine procedures. Keep newly admitted animals separate from other animals for 4-7 days. Litters may be kept together. If health problems are apparent or suspected, the quarantine time should be extended. Do not allow cages to touch. Use separate feeding utensils and containers for each cage. Effective quarantines reduce the risk of the new admits transmitting diseases and parasites to the healthy animals, as well as exposing new animals to health problems of animals already in rehabilitation.

A nutritious diet is always important. However, it is even more critical when an animal was unable to absorb adequate nutrition for more than a few days, whether it was due to a food source, long-term diarrhea, parasites, or other problem. Take extra care to feed highly nutritious diets for these animals and avoid 'treats' with limited nutrient value. In the case of the juvenile squirrels that have had long-term diarrhea and slow growth, this means feeding a very high quality rodent chow, such as Labdiet® 5002 or Harlan-Teklad 8640. Avoid feeding nuts or seeds, particularly those high in phosphorus that can aggravate nutritional disorders. Articles available.

If the inadequate nutrition from any cause continued for more than a week, watch for any signs of nutritional disorders, such as slow growth, delayed or difficult teething (not chewing

or eating solids as early or comfortably as juvenile squirrels should for their age), poor fur condition or amount, thin bones, or lower than normal activity levels. The animal may need nutritional supplements, such as extra calcium. Consult with a veterinarian knowledgeable about nutritional disorders, such as those working with exotic animals that may develop metabolic bone disease (e.g., iguanas, lizards) for specifics. Some holistic veterinarians also may prescribe a couple doses of homeopathic remedies to support healing from nutritional disorders.

### Thanks and next steps

Another **huge thanks** is offered to rehabilitators, veterinarians and others who have shared information, cases, suggestions, and general support for this rehabilitation community effort to help the wild animals in our collective care.

We continue to gather information and will share it on a regular basis. If you have additional input on symptoms or test results, such as from stool culture sensitivities, blood work or necropsies, we would appreciate your contacting us so that the information may be consolidated, trends analyzed, and data shared. Information on treatments, product analysis, and other resources is appreciated. The information can be emailed to us at [wrehabproject@me.com](mailto:wrehabproject@me.com)

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