

Reducing Anxiety in Eastern Cottontail Rabbits

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***This handout contain excerpts from Red Creek Wildlife Center's new book
"Raising the Neonatal Eastern Cottontail Rabbit" available on Amazon.com***

Raising cottontails has always been challenging. Seemingly healthy bunnies will suddenly die with no external signs indicating why they died. Others will quickly bloat or develop watery diarrhea and, again, die. However, I have often witnessed a single rabbit in a litter that grows and thrives without complications and is successfully released, the only survivor of its siblings.

Often these deaths are explained simply as "they are bunnies." We point to the complicated digestive development of young rabbits and try to find the perfect milk formula and weaning program to avoid these problems.

For years I tried to duplicate what happens in the nest to make the bunnies' development as natural as possible. Others have pointed to stress as being the culprit, and I believe this has come closest to what is happening.

The effects of stress were driven home one day this past spring when there was a house fire a few blocks from my home. I had thirty-six cottontails ranging from one day old to seventeen days old. A few were single rabbits with no siblings, while others were members of litters numbering two to eight. Each rabbit was healthy and doing well. No digestive issues were present.

When the fire occurred, several fire companies from neighboring towns arrived to fight the fire. Each fire truck, with full sirens and air horns sounding, slowed in front of my home as they approached a stop sign and turned one block away. A few stopped directly in front of my house as they attempted to noise-blast their way through the traffic. The sound was deafening and was repeated every few minutes as yet another truck passed.

Two hours later, four bunnies were dead. Twelve hours later, three more had died, and five developed bloat and diarrhea. Rabbits continued to decline over the next two days until nineteen died directly related to that stress event by the third day.

However, seventeen of the original bunnies were alive with no apparent signs of distress. So why would a stress event kill some bunnies yet not affect the others? Although we say that stress kills, clearly, it doesn't always kill.

Because I was researching different formulas in a large number of rabbits, I took many photos and kept copious records of each bunny. Every feeding was documented, as were their weights every twelve hours. I also documented stress levels and behavior on each animal's record.

When I compared the records of the bunnies that died from this event to those that survived, there was one stark difference. The bunnies that died were high anxiety bunnies, screaming and kicking during stimulation, weigh-ins, and feedings. The survivors were calm and easy. I had labeled them as "CHILL." Their natural anxiety levels were low. So it wasn't the stress that was fatal, but anxiety and fear.

Valerian Root

Valerian root is a natural herb used for centuries for anxiety and to aid sleep. It is natural, inexpensive, and can be obtained without a prescription.

I picked up a bottle of NOW brand valerian root extract and tried one drop with one high-anxiety bunny. It had a slight effect where, during the next feeding, the bunny made chirping sounds instead of ear-piercing screams when picked up. Two drops resulted in a "CHILL" bunny.

As bunnies arrived daily, I put each into one of two groups, those receiving valerian root and those who were not. Those receiving the valerian root not only thrived but gained weight faster than the control group. Within two weeks, I put all the bunnies on the valerian root extract.

Sudden death was eliminated. Not a single bunny died without clinical signs.

Digestive issues diminished. The digestive issues that did arise developed slower, allowing time to find the cause and treat the bunnies.

Although this seemed like a magical elixir, one thing concerned me. The NOW brand of valerian root contains alcohol: 20%. I was wondering if the alcohol was causing the calming effect, so I purchased two separate brands of valerian root that were alcohol-free.

The alcohol-free valerian root had some effect on the bunnies, but it took a great deal more of the product to produce an effect, and they began having tar-like stools. Was the alcohol the effective treatment?

To test the theory, I gave a selection of bunnies vanilla extract. Vanilla also has calming properties and is soothing to the digestive system. It also is an anti-inflammatory compound. It contains 25% alcohol.

The vanilla extract had some calming effect but was not as pronounced as the NOW valerian root, and the effect did not last as long. The calming effect of the valerian root extract lasts well over twelve hours. The vanilla extract didn't even last two hours.

I did, however, like the other properties of vanilla, specifically its anti-inflammatory and digestive-soothing properties, so I had one more mixture I wanted to try.

I mixed equal parts of the non-alcohol version of valerian root with the vanilla extract in a dropper bottle. I used the same dosing schedule as I used with the NOW brand valerian root.

This mixture of valerian root and alcohol had a similar calming effect as the NOW valerian root. So, it appears to be a combination of valerian root and alcohol that has a lasting calming effect on the bunnies. However, the bunnies' stools became soft and oozed a dark oily staining that looked similar to diarrhea.

After a few days, a few bunnies developed digestive swelling, which did not occur with the NOW valerian root. This mixture could be used as an emergency treatment for very stressed bunnies, but I don't suggest keeping them on it longer than one day.

A Game Changer

I now give NOW brand valerian root to every single cottontail bunny that arrives. It has significantly raised my success rate.

From March through most of August 2022, I did many comparative studies of formulas, bedding choices, weaning strategies, and other various products. Determining a success rate with so many different variables isn't productive. I decided it was time to settle on one protocol and test it with every cottontail.

From August 25 through October 2022, I stopped all comparative studies, chose one formula and one weaning protocol. I wanted to see what the success rate was for all bunnies arriving.

During that period, Red Creek received eighty-nine bunnies ranging from newborn to ten days old. Seven died shortly after arrival, and twenty-five were euthanized because their conditions were too severe to attempt rehabilitation.

That left fifty-seven bunnies to raise. Thirty were eyes closed, and twenty-seven were six to ten days old.

(30) Eyes closed bunnies:

5 died from unresolved digestive issues.

25 were released

83% release rate

(27) 6 – 10 day old bunnies:

1 never started eating past its ability to digest milk.

2 died – developed diarrhea that never responded to treatment

24 were released

88% release rate

Average release rate all totaled = 86%

Dosing

Valerian root elixir can be given as drops into the mouth (they do like it), mixed with oral hydration fluids, or directly in the milk.

To add to what is being fed to the bunnies, open and place the drops into the syringe. Replace the plungers, being careful not to expel the liquid. Fill with your formula.

Dosing is “per bunny” and not dependent on weight or age.

I start with two drops of valerian root elixir and log the bunny’s anxiety level. Is it “chill, squirming, stiff, squeaking, screaming, or shocky?”

Twelve hours later, I observe the bunny when it is picked up, stimulate it if needed, and weigh it. If it is relaxed, it remains on two drops. If its anxiety is still evident, I add an additional drop. Repeat this process every twelve hours until a “chill” effect is reached.

Most bunnies are good on two drops per twelve-hour feeding. Some need three or four. Rarely does one need more. Six drops were the highest I had given, and it did not appear to have negative side-effects.

The effect lasts over twelve hours, but it does not last a full twenty-four hours. Bunnies admitted when older that are weaning and being milk-fed once daily should receive drops by mouth during the non-feeding interval.

With bunnies that have been with me for a week or so, I find I can stop the drops completely once they start eating greens. By this time, they have calmed naturally to the routine and do not seem anxious during the once-a-day milk feeding.

I also stop the drops if a bunny or a litter does develop digestive issues. This allows me to treat the cause without too many ingredients going into their digestive system.

Suggested Formulas

Some formulas perform well with older bunnies (eyes open) but do not produce healthy bunnies from birth through five days old (eyes closed). Therefore, pay attention to the ages listed for the formulas, as well as my notes on each.

You might notice that many of these formulas do not match the suggested solids/fat/protein ratios listed in the previous section. However, I have tried these on hundreds of cottontails and believe these to be excellent formulas for producing healthy bunnies.

All formula nutrition ranges listed according to the WildAgain's Wildlife Formula Calculator

<https://www.ewildagain.org/wildlife-formula-calculator>

KMR and Ultraboost

Notes: This is now my “go-to” formula. It produces healthy bunnies of all ages, birth through weaning, with a slight change in the solids/water concentration.

Syringe-fed bunnies like the taste.

The formula should be strained before using a 3.5 french intubation tube.

Formula #1 Birth to 5 days old Mix by measure (not weight):
1 part KMR powder or 2 scoops
1 part Fox Valley Ultraboost 2 scoops
2.25 parts water 5 scoops

Formula #2 6 days and older Mix by measure (not weight):
1 part KMR powder or 2 scoops
1 part Fox Valley Ultraboost 2 scoops
2.5 parts water 6 scoops

Range				
	Solids	Protein	Fat	Carbs
Formula #1	26.8	9.7	11.0	3.9
Formula #2	23.5	8.5	9.6	3.4

Wombaroo

Notes: Wombaroo milk replacer for rabbits yields beautiful cottontail bunnies of all ages. However, there are some drawbacks that you should be aware of.

Wombaroo is extremely expensive compared to other formulas. Since it is manufactured in Australia, the United States is not the primary market, and it can sometimes be very difficult to find.

It is very sticky, and most of the bunnies I've fed it to didn't like the taste. This poses a problem when syringe-feeding bunnies who often spit it out. The stickiness requires a bath to remove, chilling the bunnies.

This is not a problem with bunnies who are intubated. The formula mixes nicely and doesn't clog intubation tubes.

Mix by weight (not measure):

180 grams of Wombaroo powder

500 mL water

or

Mix by measure (not weight):

3 tsp of Wombaroo powder

12.5 mL Water

Makes 20 mL of milk

Range			
Solids	Protein	Fat	Carbs
24.7	9.7	11.2	2.4

Fox Valley Day One 38/47 (moose)

Yes, if you thought that feeding moose formula to bunnies was crazy, you can blame me. I introduced this formula to the world at the New York State Wildlife Rehabilitators Council’s (NYSWRC) conference in 2018.

This was my “go-to” formula for five years until this past summer when a twenty-pound container was contaminated by my dog (Yes, my Doberman loves the taste). I was forced to switch to the KMR/UltraBoost formula above and love it even more.

Formula #1 Birth to 5 days old Mix by measure (not weight):
 1 part FV 38/47 or 4 scoops
 1.25 parts water 5 scoops

Formula #2 6 days and older Mix by measure (not weight):
 1 part FV 38/47 or 2 scoops
 1.5 parts water 3 scoops

Range				
	Solids	Protein	Fat	Carbs
Formula #1	25.5	10.2	12.6	4.0
Formula #2	22.3	8.9	11	3.5

FV 32/40, Esbilac, and GME

Fox Valley 32/40 (32% protein/40%Fat) has been the standard for rehabilitators for many years. Fox Valley even lists it as the formulation for cottontails. Esbilac and GME (Goat’s Milk Esbilac) have similar protein/fat ratios (33/40).

Although some wildlife rehabilitators state that they do well with these products, many others claim they do not have good results when raising bunnies. I find them lacking when it comes to raising cottontails.

None of these products contain enough protein or fat to make a suitable base, even if adjusted to raise these nutrients. Eye’s closed bunnies will not develop enough visceral fat to carry it through the weaning process and will show signs of malnutrition. The products might be

passable for older bunnies, but they will survive and thrive better on more concentrated nutrition.

If you don't have the ingredients for our suggested formulas, these products can be used temporarily while you wait for the proper supplies to arrive.

Other Milk Products and Recipes

There are numerous milk replacer products out there as well as suggested recipes. However, it is best to stick to the suggested formulas unless you are familiar with the products or understand the nutrition behind replacement milk formulas.

One product that I have not suggested is Zoologic Milk Matrix. I didn't list these because I have no recent experience with the line of products. However, I don't want my omission to appear as a criticism. Many rehabilitators use these products and are very happy with them.

That said, if you have been using a milk formula that has produced beautiful bunnies even 25% of the time, you probably have a good formula. Unfortunately, you've just had difficult bunnies. In this case, adding the NOW brand valerian root to your protocol should significantly increase your success.

Weaning

Begin supplying a variety of weaning foods at eleven days old. This can be determined by signs of urination in the bedding.

It may take several days until the bunnies begin to eat the greens. There are several ways to tell that they are actively eating:

You witness them chowing down.

Be careful not to mistake “sampling” for eating. I’ve witnessed bunnies sampling greens as young as six days old.



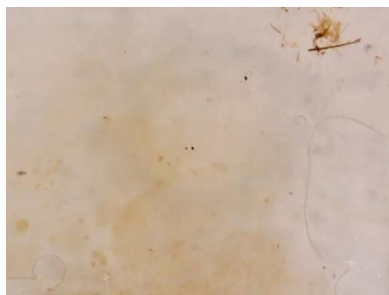
Greens have disappeared.

If there are no greens left, of course, they are eating. If it looks like natural greens, such as dandelion and clover, have lessened in volume, be careful that they haven’t just wilted.

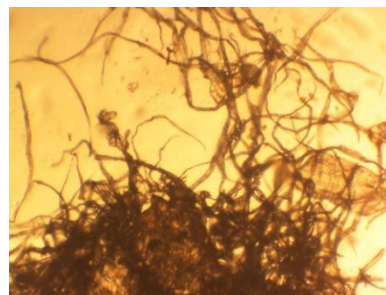
Signs of chewing become obvious on larger leaves such as romaine lettuce.

Fiber and leaf sections are visible in the stool.

If you have a microscope, leaf sections and plant fibers are visible under a 40X lens.



40x fiber in upper right corner of the slide



400x magnification of fiber in a stool smear

Urine turns orange.

Ingesting dandelion and plantain turns rabbit urine orange, and it is obvious on white paper towels. This is my go-to method for determining if bunnies are eating the greens or not. Kale will also darken the urine but not to the vibrant orange that natural grasses do. This doesn't work with romaine lettuce, which doesn't change the urine enough to be visible.



No visible orange.



One or more bunnies are beginning to eat greens



A large amount of orange urine. Bunnies are actively eating.

Weaning

Once you've determined that the bunnies are eating greens, you can begin feeding them 15% of their body weight once each day.

This is a very delicate time for young rabbits, and you must monitor them closely. If you've been weighing them only once a day, it is imperative that you begin weighing them every twelve hours.

You will be checking the bunnies every twelve hours. One of those times, they will receive a milk feeding. Twelve hours later, you will replenish their greens and clean their container.

It's up to you whether you decide to give milk in the morning or the evening feeding. Since nursing or tubing them takes more time, do what is best for you. I personally like to give the milk feeding in the morning. I have more time and energy in the mornings, and I prefer them to be hungry overnight when they are most active.

Your schedule is set up at alternating twelve-hour intervals.

Interval #1 - Milk:

Weigh the bunnies and document their weight.

Feed milk at 15% of their body weight.

Clean the container and add fresh greens.

Interval #2 - Greens:

Weigh the bunnies and document their weight.

Clean the container and add AMPLE fresh greens.

Subsequent intervals:

Weigh the bunnies and document their weight.

Did the bunnies gain weight in the past twelve hours?

If NO (they lost or remained the same)

Return to interval #1

Feed milk at 15% of their body weight.

Clean the container and add fresh greens.

If YES (they gained since the weigh-in twelve hours prior)

Repeat interval #2

Clean the container and add fresh greens.

Date	Time	Age	Pink	Blue	Green	
24-Sep	A	13	114	105	76	SLIGHT ORANGE URINE
			12CC KMR-UB	11CC KMR-UB	9CC KMR-UB	
	P		117	110	84	VERY ORANGE URINE
			12CC KMR-UB	11CC KMR-UB	9CC KMR-UB	
25-Sep	A	14	120	112	88	INTERVAL 1 - 15%
			18CC KMR-UB	17CC KMR-UB	13CC KMR-UB	
	P		125	118	94	INTERVAL 2
			GREENS	GREENS	GREENS	
26-Sep	A	15	123	116	93	LOST - INTERVAL 1
			18CC KMR-UB	17CC KMR-UB	13CC KMR-UB	
	P		127	119	96	INTERVAL 2
			GREENS	GREENS	GREENS	
27-Sep	A	16	128	119	97	INTERVAL 2
			GREENS	GREENS	GREENS	
	P		121	106	97	LOST - INTERVAL 1
			18CC KMR-UB	17CC KMR-UB	14CC KMR-UB	
28-Sep	A	17	125	115	101	
			GREENS	GREENS	GREENS	INTERVAL 2
	P		121	109	100	
			18CC KMR-UB	17CC KMR-UB	14CC KMR-UB	LOST - INTERVAL 1
29-Sep	A	18	127	112	103	
			GREENS	GREENS	GREENS	INTERVAL 2
	P		127	115	105	
			GREENS	GREENS	GREENS	INTERVAL 2
30-Sep	A	19	129	116	109	
			GREENS	GREENS	GREENS	
	P		130	118	111	
			GREENS	GREENS	GREENS	
1-Oct	A	20	131	120	121	
			GREENS	GREENS	GREENS	
	P		133	124	121	
			GREENS	GREENS	GREENS	
2-Oct	A	21	136	123	124	
			GREENS	GREENS	GREENS	
	P		135	126	125	
			GREENS	GREENS	GREENS	
3-Oct	A	22	140	128	126	
4-Oct	A	23	147	136	131	
5-Oct	A	24	151	137	133	
			RELEASED	RELEASED	RELEASED	