



## Laminitis Update

# The Supercoriatitis (Laminitis) Pathway

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### Article Summary:

Having redefined laminitis in SRP Bulletin #101, the author here traces the causality and destructive path of Supercoriatitis.

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## INTRODUCTION

Mounting scientific evidence from the veterinary research community continues to support the thesis that Supercoriatitis (“laminitis”) follows from digestive disorder caused by things we give, or force, horses to ingest that are unnatural and harmful.<sup>1</sup> This was the premise of my book, *Founder: Prevention and Cure the Natural Way*,<sup>2</sup> and nothing to date has changed my mind. Moreover, this outlook is now shared by many other natural hoof care practitioners in the field with whom I am in regular communication.<sup>3</sup>

Those of us at the forefront of the natural hoof care revolution also believe that the *only* effective means of treating and preventing laminitis is to institute natural horsekeeping and hoof care practices. Foremost, this means regulating—*naturalizing*, to be precise—the horses *diet* and his *feeding behavior*. At the same time, one must be questioning of and vigilant against the many impediments to natural healing associated with conventional farriery, veterinary, and pharmaceutical treatments.

The purpose of this article is to pre-

sent recent veterinary research that explains in the most simplest of terms the pathophysiological pathway of Supercoriatitis: how we get from dietary distress to a separation of the horse from his feet. This research reinforces what I presented in *Founder*, but brings new information to light.

This article does not explain how the Supercoriatitic hoof should be trimmed, a matter taken up in another bulletin and companion video.<sup>1</sup> The reason for using the new term *Supercoriatitis*, instead of “laminitis”, is also explained in a separate bulletin.<sup>2</sup>

As with all facets of natural hoof care and horsekeeping practices, the exemplary model for preventing and healing Supercoriatitis is the natural lifeway of the wild, free-roaming horse.

## “DEAD ENDS” ON THE SUPERCORIATIC PATHWAY

As stated, natural hoof care practitioners hold that the pathogenesis of Supercoriatitis is rooted in dietary toxicity. Other causes are rejected as “dead ends” in the search for causality and accountability. Some of these are worth men-

<sup>1</sup>Robert A. Ustace, BVSc, UK Laminitis Trust, “Laminitis: Latest Thoughts On Laminitis”; article found at: [www.worldzone.net](http://www.worldzone.net)

<sup>2</sup>Available from Star Ridge Publishing ([www.star-ridge.com](http://www.star-ridge.com)) or other retail book outlets nationwide.

<sup>3</sup>Visit the website of the American Association Of Natural Hoof Care Practitioners (AANHCP): [www.aanhcp.org](http://www.aanhcp.org)

<sup>1</sup>“Trimming the Supercoriatitic (Laminitic) Hoof”, Video and Bulletin #104, SRP Natural Hoof Care Series

<sup>2</sup>“*Supercoriatitis*: Laminitis Redefined”, Bulletin #102, SRP Natural Hoof Care Series



**Figure 1** Water holes like this one in wild horse country ice over during the winter. This herd will break the ice with their powerful hooves to drink. Wild horses also eat snow to meet their water needs.

tioning here:

*Cushing's Syndrome* is widely believed by the veterinary community to be a cause of "laminitis". However, natural hoof care practitioners view Cushing's to be a metabolic disorder itself wrought by unnatural feeding practices and chemical-pharmaceutical pollution. We have seen no convincing evidence that *Supercoriatitis* follows from Cushing's.

*Concussional laminitis*, also known as *road founder*, is held, among others, by the farriery community to be caused by riding the horse over hard (especially hot) surfaces, such as city pavement. But natural hoof care practitioners have been able to correlate all such alleged cases brought to their attention with dietary toxicity; moreover, research shows that the hoof's natural architecture is able to withstand ten times the amount of wear and tear associated with domestic horse use.<sup>1</sup> [Note: The horse's feet, legs, joints, etc., are stressed by riding on pavement for extended periods; use hoof

boots to minimize harmful concussional shock and improve traction.<sup>1</sup>]

Laminitis is also attributed to horses standing in or drinking cold or icy water after extensive riding. Laminitis researchers have shown conclusively that standing in cold water does not trigger *Supercoriatitis*.<sup>2</sup> I have observed personally on many occasions wild horses drinking and standing in cold mountain water after running, and without apparent ill effects to the feet (Figure 1).

*Cresty neck* is another purported cause of laminitis. But this is nonsense. It is a form of obesity (see below) and is a symptom of the dietary problem rather than a cause.

*Obesity* is often heralded as a major cause of laminitis. But obesity, like "cresty neck", follows from unnatural horsekeeping (e.g., lack of sufficient exercise, diet and feeding behavior) practices. Carrying excess body weight does not cause *Supercoriatitis*, or all preg-

<sup>1</sup>Thomasan, Biewener, and Bertram. "Surface Strain on the equine hoof wall in vivo: implications for the material design and functional morphology of the wall." (1992: J. Exper. Biol.) 166: 145-165

<sup>1</sup>For quality hoof boots, go to: [www.swissboot.com](http://www.swissboot.com)

<sup>2</sup>Chris Pollit, "Equine Laminitis: A Revised Pathophysiology," *European Farriers Journal*, p. 22

nant mares would be stricken, which is not the case either in domestic or wild horse populations. However, obese horses on unnatural diets probably are toxic, and, therefore, are Supercoriatic “powder kegs” ready to explode.

One also hears, generally among barefoot trimmers (as opposed to natural hoof care practitioners), that laminitis is caused by horseshoeing, particularly orthopedic shoeing. But there is no evidence for this claim, in my opinion. As a former (20 year) veteran shoer “turned” natural hoof care practitioner, I can’t recall a single instance in which a previously barefoot horse suddenly “foundered” as a consequence of having just been shod.

But not to let shoers, or “horseshoe happy” vets, entirely off the hook, there is no doubt in my mind that shoeing predisposes the pre-Supercoriatic hoof to an outbreak, and also impedes or prevents healing once the attack has occurred. Shoeing causes hoof contraction, which compromises circulation and weakens the hoof overall.<sup>1</sup> Orthopedic shoes (e.g., “heart-bars”) in particular irritate the solar corium and P3.<sup>2</sup> Shoeing also creates unnatural lever forces due to excessive growth beneath the shoe, since the capsule does not wear. Commonly, this growth then “migrates” forward into a pathologically deformed “run-under” hoof with “curled toes” and severe wall cracks (Figure 2).

### SUPERCORIIAITIS PATHWAY:

The Supercoriatic pathway begins with one or more dietary trigger factors (e.g., sweetened grains and green grass). These upset the horse’s *natural* digestion, setting off a chain reaction of events that culminate in the destruction of the horse-to-hoof “attachment mechanisms”.<sup>3</sup>

Figure 3 (page 4 of this article) provides a simplified schematic of the Supercoriatic pathway:

#### Diet

Supercoriatic (“laminitis”) originates with unnatural diet *and* unnatural feeding behavior. Diet encompasses anything we give the horse to eat or drink that

<sup>1</sup>“Does Horseshoeing Cause Hoof Contraction”, Bulliten #111, SRP Natural Hoof Care Series

<sup>2</sup>“Supercoriatic: Laminitis Redefined”, Bulliten #102, SRP Natural Hoof Care Series

<sup>3</sup>“The Supercorium”, Bulliten #110, SRP Natural Hoof Care Series

Star Ridge Files



**Figure 2** This Supercoriatic hoof had been shod for two years and refused to heal before being brought into natural hoof care.

stresses his digestive tract and results in Supercoriatic. It may come as a shock to horse owners, but many things that we believe or take for granted to be “natural” for horse consumption, are anything but. The most surprising trigger, for sure, is green grass. As recent as this winter (2002/2003), researcher Dr. Robert Eustace of the Laminitis Trust (United Kingdom), issued this warning:

It is worth recognizing that while there is much we still don’t understand about the mechanisms whereby an upset in the horse’s hindgut can lead to the devastating changes in its feet caused by laminitis, if everyone applied the knowledge we do have, then the incidence of laminitis would be reduced by about 80%. Put simply, allowing horses and ponies unrestricted access to improved pastures is putting them at high risk of developing laminitis.<sup>1</sup>

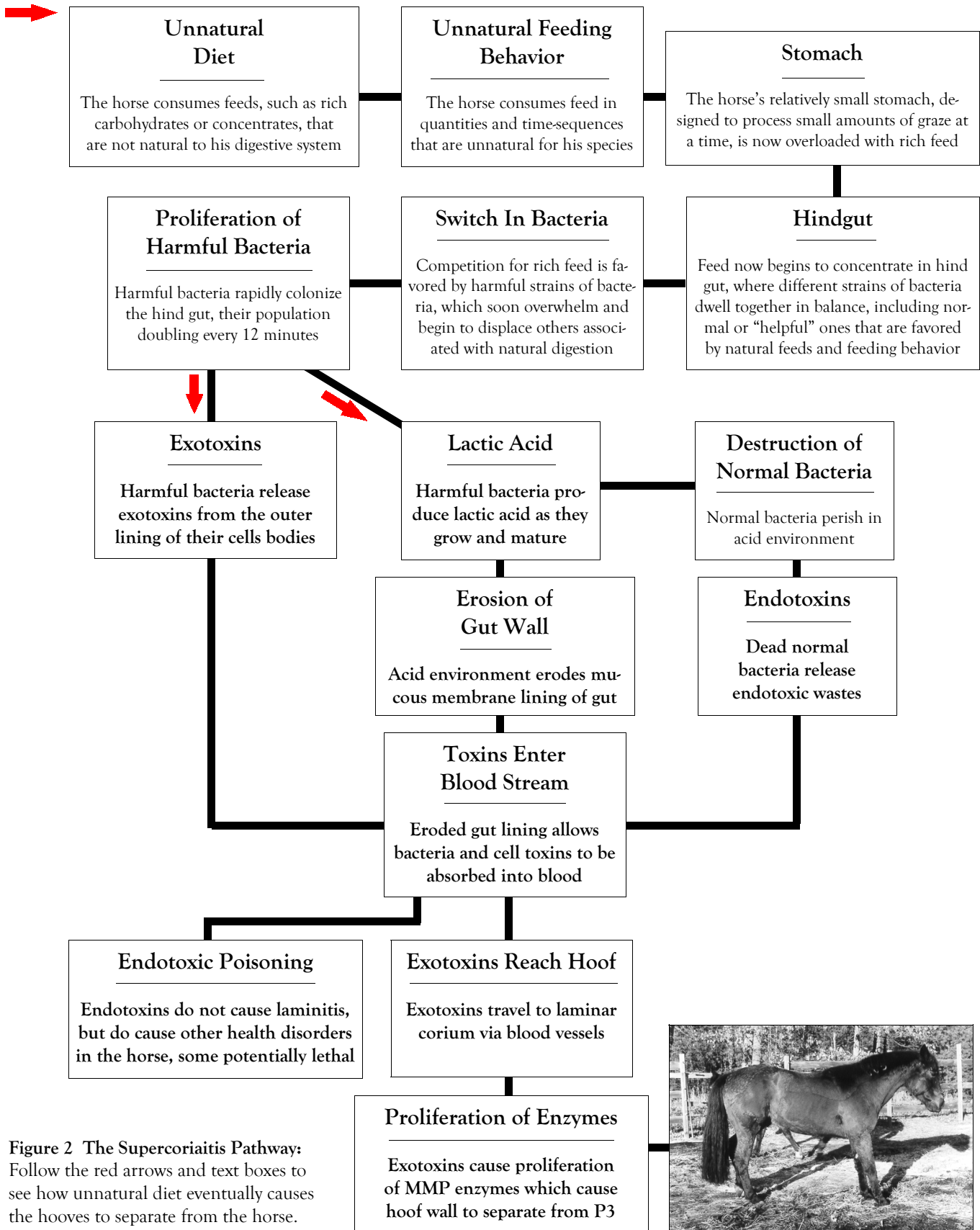
Other likely dietary triggers are legume grasses and their hays (e.g., Alfalfa and Clover), grains (especially sweet feeds), vitamin concentrates, and pharmaceutical chemicals laced with sugars or legume concentrates.

#### Feeding Behavior

Feeding behavior that allows or compels the horse to ingest concentrations of these substances also contributes to the pathophysiology of Supercoriatic. While

<sup>1</sup>Ibid, R. Eustace.

# the SUPERCORIAITIS (LAMINITIS) PATHWAY



Horse enduring acute laminitic attack

Figure 2 The Supercoriaitis Pathway: Follow the red arrows and text boxes to see how unnatural diet eventually causes the hooves to separate from the horse.





**Figure 4** Although vast, wild horse country is a landscape of sparse vegetation. Wild horses must travel many miles in a given day to meet their nutritional needs.

eating a small amount of green grass or sweet feed now and then probably won't trigger a Supercoriatic response in the average horse, allowing the horse to consume small amounts daily, or chow down for an hour or more, may very well cause an attack. So, feeding behavior, like the feed itself, must be scrutinized on the Supercoriatic pathway.

#### Stomach

The dietary triggers soon begin to wreak havoc on the horse's digestive system—the prelude to Supercoriatic. Because the damage taking place early on cannot be seen or otherwise detected by the human eye, the first phase of Supercoriatic is “silent and deadly”.

The pathway starts in the stomach—an organ adapted, according to the wild horse model, to process small quantities of forage over hours and hours of grazing time on relatively sparse rangelands (Figure 4).

Most domestic horses, however, are probably already in trouble at this stage, since modern feeding practices tend to concentrate large quantities of toxic feeds in each feeding. As I have explained in *Founder*, our horses are actually starving because the horse's digestive organs cannot naturally process the feeds in such short order without becoming toxic. Psychologically, horses are conditioned to “gorge” themselves in order to stave off hunger created by the burgeoning tox-

icity. It is a viscous cycle, and once the horse's digestive system becomes hostage to it, the pathway to Supercoriatic is virtually set in stone.

#### Hindgut

So, with all the toxic trigger factors crammed in the stomach, there is no where else to go next but into the intestines and concentrate there. This environment is normally a habitat for many digestive flora and fauna that thrive together naturally in what is a delicate state of ecological balance. The high incidence of colic and laminitis among domestic equines testifies to just how precarious the equilibrium is when our dietary programs are not well thought out. Not surprisingly, the equilibrium immediately begins to shift as digestive bacteria compete for “available forage”.

#### Switch in Bacteria

The horse's hind gut is home to various strains of bacteria. They “eat” what the horse eats, and, in the process, help the horse to break down and metabolize his food. Like everywhere else in the food chain, these bacteria must compete with each other for what's available. Bacteria that enable normal digestion are dependent on a natural diet driven by natural feeding behavior, such as we see among wild horses in wild horse country. When this is the case, these bacteria prevail as

the dominant species in the horse's gut.

With the introduction of dietary trigger factors, however, there is a sudden switch in the bacterial population. Now, other strains of bacteria, harmful ones, which prefer large concentrations of green grass or rich grains in the hind gut, began to multiply and colonize in full force. The "helpful" bacteria, which are adaptable to the more "frugal" wild horse diet, begin to decline for lack of "suitable forage".

#### Proliferation of Harmful Bacteria

The harmful bacteria soon overrun the hindgut. Laminitis researchers now have evidence that *Streptococcus bovis* and at least one other species of bacterium, double their population every 12 minutes! Meanwhile, the natural digestive bacteria continue to starve and dwindle in numbers.

#### Lactic Acid and Exotoxins

As the harmful bacteria proliferate, they produce lactic acid as they grow and mature. The outer linings of their cell bodies, called "exotoxins", are also shed.

#### Destruction of Normal Bacteria

As the acidity of the hind gut increases due to the proliferating harmful bacteria, the normal bacteria cannot adapt and begin to die off. Toxins from inside their cell walls ("endotoxins") now leak into the gut.

#### Erosion of Gut Wall and Contamination of Blood

The lactic acid begins to erode ("lactosis") the mucosal lining of the gut. As ulcers form, harmful bacteria and dead cell matter (endotoxins and exotoxins) in the gut are then absorbed into the bloodstream, traveling throughout the horse's body.

#### Exotoxins Reach Hoof

Exotoxins, harmful bacteria, and other soluble gut contents absorbed into the blood, now reach the vascular system within the hoof, where damage to the hoof-to-horse attachment mechanism commences.

#### Proliferation of Enzymes and Separation of the Hoof From the Horse

New research has shown that these toxins perfuse the Supercorium and then adversely impact the various

attachment mechanisms of the sub-cornia securing the hoof to the horse. This research has focused primarily on the lamellar bonds of the inner hoof wall. For example, according to the U.K. Laminitis Trust:

There are a group of enzymes in the laminae called MMP's. Their normal function is to allow growth of the hoof down the foot by attaching and detaching the hoof capsule from the underlying laminae. The exotoxins from the bacteria in the gut cause a mass activation of these enzymes which appears to cause the hoof to detach from the horse.<sup>1</sup>

### SUMMARY

Supercoriatitis ("laminitis") is the dietary induced inflammation of the Supercorium resulting in the failure of the horse-to-hoof attachment mechanisms. With much brevity, this article has described the Supercoriatitis pathway leading to the attachment failure. Researchers continue to study the precise pathophysiology leading to breakdown, as well as the trigger factors that initiate the disease.

Natural hoof care practitioners approach the treatment and prevention of Supercoriatitis from the standpoint of the wild horse model. They know from studying the lifeways and hooves of wild horses, where Supercoriatitis is nonexistent, that what and how we feed domestic horses today, is not natural. The epidemic levels of Supercoriatitis equines worldwide testify to this.

Through years of observation and experimentation, natural hoof care practitioners have learned that naturalizing the equine's diet and living quarters will ameliorate and restore his devastated digestive system. Restoring his feet to their native natural conformation is accomplished effectively and humanely through genuine natural hoof care—an indispensable adjunct in the "whole horse" approach to Supercoriatitis rehabilitation and prevention.

<sup>1</sup>Ibid, R. Eustace

# QUESTIONS & ANSWERS ABOUT THE SUPERCORIAITIS (LAMINITIS) PATHWAY

**I want to make sure I understand you correctly. Are you saying that “green grass” is not natural for horses?**

Yes. The matter is under debate, but mounting scientific research, cited in this article, supports this thesis. The fact that all horses do not succumb to grass founder does not dissuade me either from this opinion. No doubt some horses are simply more resistant to bacterial diseases than others, and this may explain why they seem immune. On the other hand, I believe the incidence of grass founder is far greater than is reported. I know from years of experience that many horse owners simply fail to recognize the symptoms of Supercoraiitis. Once they do, it's often too late, and, today, many of these horses, most probably, are put down and buried on private property.

In my book, *HOG*, I speculated that grass founder may have been a cause of the horse's extinction in North America following the Pleistocene (Ice Age) epoch. As the glacial sheets retreated, vast temperate grasslands spread across North America, including the now arid American Southwest. *Equus caballus*, and perhaps other ungulates too, could not adapt due to their evolved digestive idiosyncrasies. In this interpretation, the herds weakened as founder members succumbed to starvation, diseases, and predators. Quickly, the food chain was thrown into disarray, affecting other “grazers” that cohabited the steppes. Predators, which depended on the dwindling populations of hoofed prey, then began to perish. In the end, not a single horse—not to mention other familiar species occupying the grass biome, prey and predator alike—survived the carnage. Not until the early Spanish explorers of the 1500s made their incursions into North America, did the horse rise again in his ancient homeland. Interestingly, today, the only significant herds of wild, free-roaming horses to be found descended from the Spanish (and other European and American) colonies, are in the arid Great Basin, where, as I've written many times before, Supercoraiitis is virtually unknown.

**What's so different about the grasses wild horses consume in the Great Basin, that they are free of laminitis?** As I am not a botanist, I can't really answer that

question on a technical level. In a separate article, I do discuss what little research exists on the diet of our wild horses.<sup>1</sup> As you will learn, they eat many, many different things, dry bunch grasses being a main staple. Also, as I wrote in *HOG*, whatever it is that they're eating ought to be investigated by the feed industry, and then grown commercially and sold to horse owners.

**Is there any research being done on Probiotics that can be used to counter the “harmful” bacteria identified in laminitis pathophysiology?** Yes. They are called MMP inhibitors, such as Foundergaurd, a product from Australia now in its testing phase. Actually, there are commercial feed supplements now on the market which claim the same benefits. But I have a problem with all of them. Nature has determined that horses and grass are not meant to mix; so, if we try to “go around” this and find chemical avenues with which to supplant natural diets, I think we are in store for serious repercussions. We wouldn't think of drinking poison followed by questionable antidotes to meet our fluid needs, not when there are safe and natural alternatives. The same should hold for our horses.

**So, does this mean that we should all start taking our horses out of pastures and putting them in lock-up for their safety?** I think horse owners should start doing this immediately, unless, of course, their ranches are in wild horse country. I don't think they should put their horses in lock-up (e.g., stalls and small paddocks), however. I've thought a lot about this over the years. What would be a positive alternative to limited stall life? I began to think about how wild horses band together and move—and eat. The result is a new concept for natural horsekeeping, which I've presented in a separate article in the Star Ridge Natural Horse Care Series: “Paddock Paradise”.<sup>2</sup> I've worked the plan up with local ranchers and a USDA official with expertise in pasture management. In referring you to it, I would like feedback from you to build into the “plan”. Paradise will then only get better and better.

<sup>1</sup>“Diet In The Equine Natural World”, Bulliten #201, SRP Natural Horse Care Series

<sup>2</sup>“Paddock Paradise”, Bulliten #200, SRP Natural Horse Care Series

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