

How do you manage your feed management?

The ultimate step-by-step plan to prevent your horse from gastric ulcers.



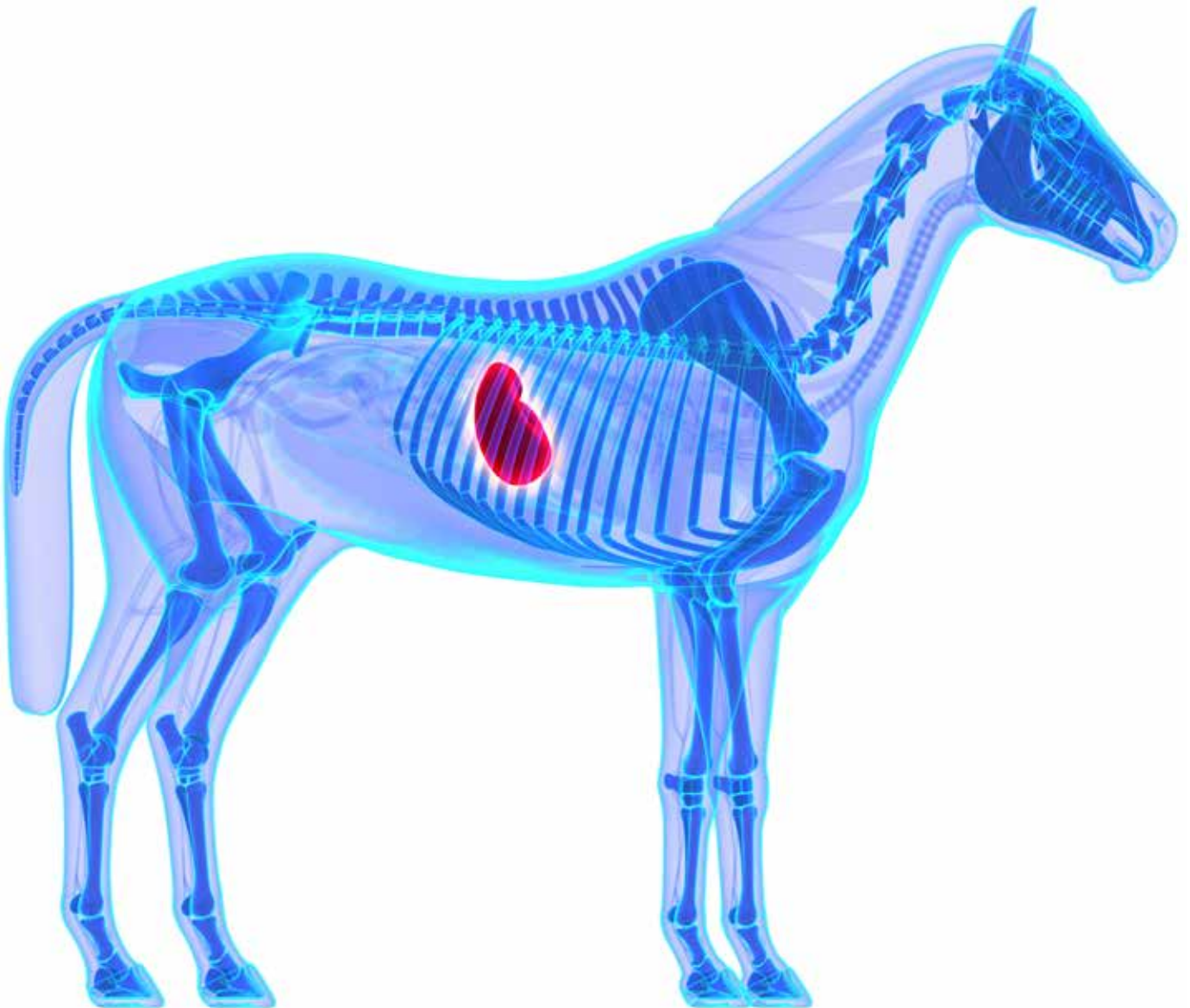
After reading this step-by-step plan, you will know:

- The possible effects of a gastric ulcer on your horse's performance
- How to recognise (early stage) gastric ulcers
- The risk factors of gastric ulcers
- What you can do to prevent gastric ulcers.

Including a handy management checklist!

The ultimate step-by-step plan for prevention

Gastric ulcers are common in horses and ponies. This has consequences for their health and their performance. Is your horse also suffering from gastric ulcers? In this step-by-step plan, we explain how you can prevent stomach problems, by modifying how you manage your horse. It includes tips from specialised veterinarians, racehorse trainer Twan Wolters, dressage rider Vai Bruntink, and handy checklists.



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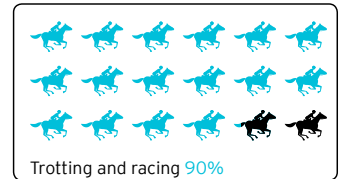
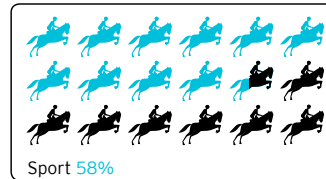
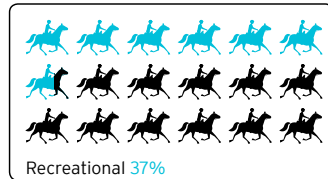
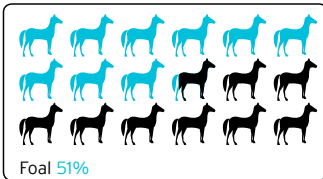
1. What is the problem?

You train hard with your horse. You have set yourself goals and are working towards them. In terms of care too, you do everything to prepare for an optimal showing. Even so, your performance is lagging. You can't quite put your finger on it, but it looks like your horse is not quite comfortable in its skin. Have you considered that it could have stomach problems?

This shouldn't come as a shock: recent estimates by experts indicate that at least 60 per cent of all sport horses and ponies suffer from gastric ulcers. It was already known that over 90 per cent of racehorses suffer from stomach problems. In this sport, it is common to

give a lot of concentrate feed and little roughage because the horses need explosive energy while carrying as little excess weight as possible. Furthermore, these horses are transported a lot and the races themselves entail the inevitable stress.

'Normal' horses and ponies also suffer from stress more than previously thought, or have a feed regime that does not entirely meet their natural needs. Gastric ulcers are found in this group regularly. That means there is certainly a chance that your horse has stomach problems, but fortunately you are not alone.



2. What is the effect of gastric ulcers?



Linda van den Wollenberg, specialist internal diseases horse at Healthcare for Animals.

Gastric ulcers have a negative effect on a sport horse's performance. A study was done on racehorses in which gastric ulcers were induced by intentionally depriving them of roughage for an extended period. Half the horses were then given medication to prevent the development of gastric ulcers, and the other half were not. Performance measurements were then done. Linda van den Wollenberg, veterinarian at GD Animal Health: "The untreated horses fatigued more quickly and their stride length was shorter. Their oxygen uptake was found to be lower. You can infer from this that gastric ulcers had a negative effect on the horses' performance. On the other hand, if a sport horse is

not eating as well because of gastric ulcers, it will not take in enough nutrients, and that also affects performance. So the one can be an effect of the other. Any way you look at it, it is clear that if there is inflammation, some of the body's processes are recruited to combat this. That means the overall health is simply not optimal."

However, little is known about pain due to gastric ulcers. Van den Wollenberg: "In human athletes it is clear that stomach problems can cause major abdominal pain during exertion. Little research has yet been done in horses, but it would seem logical that they also feel this pain. Compare it to a scrape that comes into contact with acid. You feel it." One horse will be more sensitive to pain than another, but moving and training with stomach problems is unpleasant for all of them, and that will be reflected in their performance.

"Gastric ulcers have a negative effect on a sport horse's performance"



3. How you can diagnose gastric ulcers

There are a number of symptoms that can point to stomach problems. The difficulty is that there is no single clear indication for proof. The signs are sometimes vague and sometimes even absent. The one horse shows more signs than the other. The absence of symptoms is no guarantee that there is no problem.

Even if you suspect that your horse is suffering from its stomach, this cannot be seen or felt with any certainty from the outside. It can only be verified by a veterinarian examining the stomach with an endoscope. A long tube with a light and a camera at the end is inserted into the stomach through the nose, and it can be seen on a screen whether there are gastric ulcers or not.



Does your horse react painful with tightening the girth?
This can indicate gastric ulcers.



What symptoms can point to a gastric ulcer?

Check what you notice in your horse:

- ☐ Suddenly not eating or eating less, reduced appetite
- ☐ Fussing a lot with concentrate feed
- ☐ Grinding teeth
- ☐ A lot of movement with lips or tongue
- ☐ Frequent yawning
- ☐ Pain response when you touch its belly or when tacking up
- ☐ Vague colic symptoms, especially immediately after eating concentrate feed
- ☐ A dull coat
- ☐ Noticeable drowsiness
- ☐ Does not sustain exertion well
- ☐ Needs a long time to recover after exertion
- ☐ Chronic diarrhoea
- ☐ Emaciation
- ☐ Behavioural change (nervous, aggressive)
- ☐ Has started crib-biting or wind-sucking

Is there a relationship between gastric ulcers and crib-biting or wind-sucking?

This does appear to be the case, although there are more possible causes and it is also known that some horses do this habitually even after the cause has been removed. Researchers think that crib-biters and wind-suckers may be trying to mimic chewing motions in order to produce acid-neutralising saliva. An inadequate supply of roughage and chronic stress can lead to both gastric ulcers and to stereotypical behaviours.





Twan Wolters, international racehorse trainer:

"I would go as far as to say that all horses in my sport have gastric ulcers." Racehorse trainer Twan Wolters has a stable of English thoroughbreds. He devotes a lot of care to their management. "Traditionally, racehorses are given large quantities of concentrate feed. Our horses do need to have a lot of energy. I try to keep a very close eye on them, and give them extra alfalfa, for example. I once had a couple of horses from England that we had examined. They were completely full of gastric ulcers. In spite of the fact we have all the roughage analysed and are very critical about what we give, I can't avoid giving concentrate feed. They can't win just on hay. Aside from that, you have the stress from the races and frequently travelling.. That doesn't only apply to us. I am certain that top jumping and dressage horses also have gastric ulcers."

Wolters says that he cannot tell how bad the stomach problems are from the outside. "Sometimes they eat less or are a bit difficult with tacking.

"Whether or not there are symptoms does not tell the whole story"

But I've had horses examined that had no sign of anything, but were still completely full of them, so I don't make predictions on the basis of whether or not there are any symptoms."

Professor Dr Marianne Sloet, University Clinic for Equine Health:

"Gastric ulcers can lead to a variety of vague symptoms. If a horse is not performing well, has a dull coat, is thin, has a reduced appetite, sometimes grinds its teeth or gapes or occasionally shows vague symptoms of colic, you certainly have to consider gastric ulcers," says Professor Sloet of Utrecht University.

"The only way to diagnose gastric ulcers with certainty is with gastric endoscopy. This involves going in through the nose and oesophagus with a 3.2 metre long endoscope, which is a tube with a camera at the end, to look inside the stomach. Gastric ulcers can occur at various locations in the stomach: in the top part that is lined with non-glandular squamous mucosa or in the bottom part lined with glandular mucosa. The severity can also vary, from minor spots to extensive sores. An accurate assessment of the problem by an experienced veterinarian and a good gastroscopy are therefore important to choose the best treatment and additional management measures. Frequent feeding of small portions, and preferably having constant access to good roughage and fresh drinking water are important aspects of good management."

"Diagnosing gastric ulcers correctly"





Vai Bruntink, dressage rider:

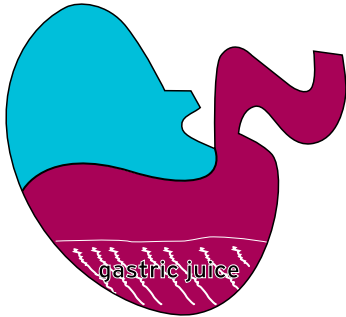
After examination, two horses of top dressage rider Vai Bruntink were found to be suffering from gastric ulcers. What sounded the alarm for her? "The one horse was clearly listless and showed far less effort in its work. The other horse increasingly showed symptoms like tacking resistance and became more capricious. Both horses actually still looked good in terms of condition, so you couldn't deduce anything from that." A veterinarian found the problem. After medical treatment, the horses were declared 'clean'. The difference was noticeable. Both horses now run like stars again! To prevent problems in the future, the management is being controlled tightly and they get appropriate feed.

**"They still
looked good".**



4. How do gastric ulcers form?

A horse's stomach is sort of a bag, 10 to 20 litres in size. The wall is coated with a mucous membrane. But this is not the same everywhere. There is a thicker layer at the bottom. Glands in this part produce stomach acid continuously. This is necessary to digest food and to protect against bacteria and other things that are undesirable for the horse's digestion. The top half of the stomach has a different type of lining that is not as resistant to gastric acid.



Chewing, chewing and more chewing

Food goes via the mouth and the oesophagus to the stomach. Horses are naturally evolved to eat high-fibre, low-calorie food and eat virtually continuously, day and night. This means they are almost constantly chewing. All we have to do is think of something tasty to start salivating. However, horses only produce saliva when they make chewing movements. That saliva not only plays an important role as a lubricant; it also neutralises the acidic gastric juices. That and the constant presence of food mash in the stomach buffers the acidity.

If the stomach is empty for extended periods because the horse is not chewing high-fibre feed, the acidity level increases so strongly that the protective mucous membrane of the wall can be eroded. This can lead to sores. This can also happen if a large portion of concentrate feed is eaten at once. Horses do not chew this feed as long as roughage, so less saliva is produced that can neutralise the

gastric acid. Furthermore, a large portion of concentrate feed suddenly makes the stomach very full, causing the acid to come into contact with the upper lining as well. Ingredients like starch and sugar mean that most types of concentrate feed are digested differently from roughage. This can promote the occurrence of gastric ulcers. Some medications such as pain killers and corticosteroids can reduce the protection of the stomach lining, making damage caused by gastric acid more likely.



A horse can only make saliva when they chew. Fibre and structure-rich food is therefore necessary!

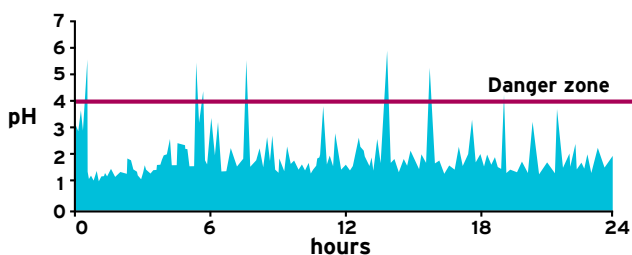
Did you know that...

A horse's stomach is extremely acidic? Food stays in the stomach for a relatively short amount of time, which is why the acid effect in horses needs to be very strong compared to other mammals. A pH value of 2.0 can be measured at the bottom of the stomach. If you stuck your hand in there, you'd have an acute burn injury...



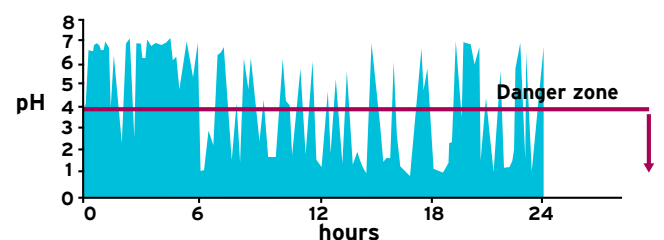
Chew → saliva production → neutralizes the stomach acid

24 hours stomach pH: without feed



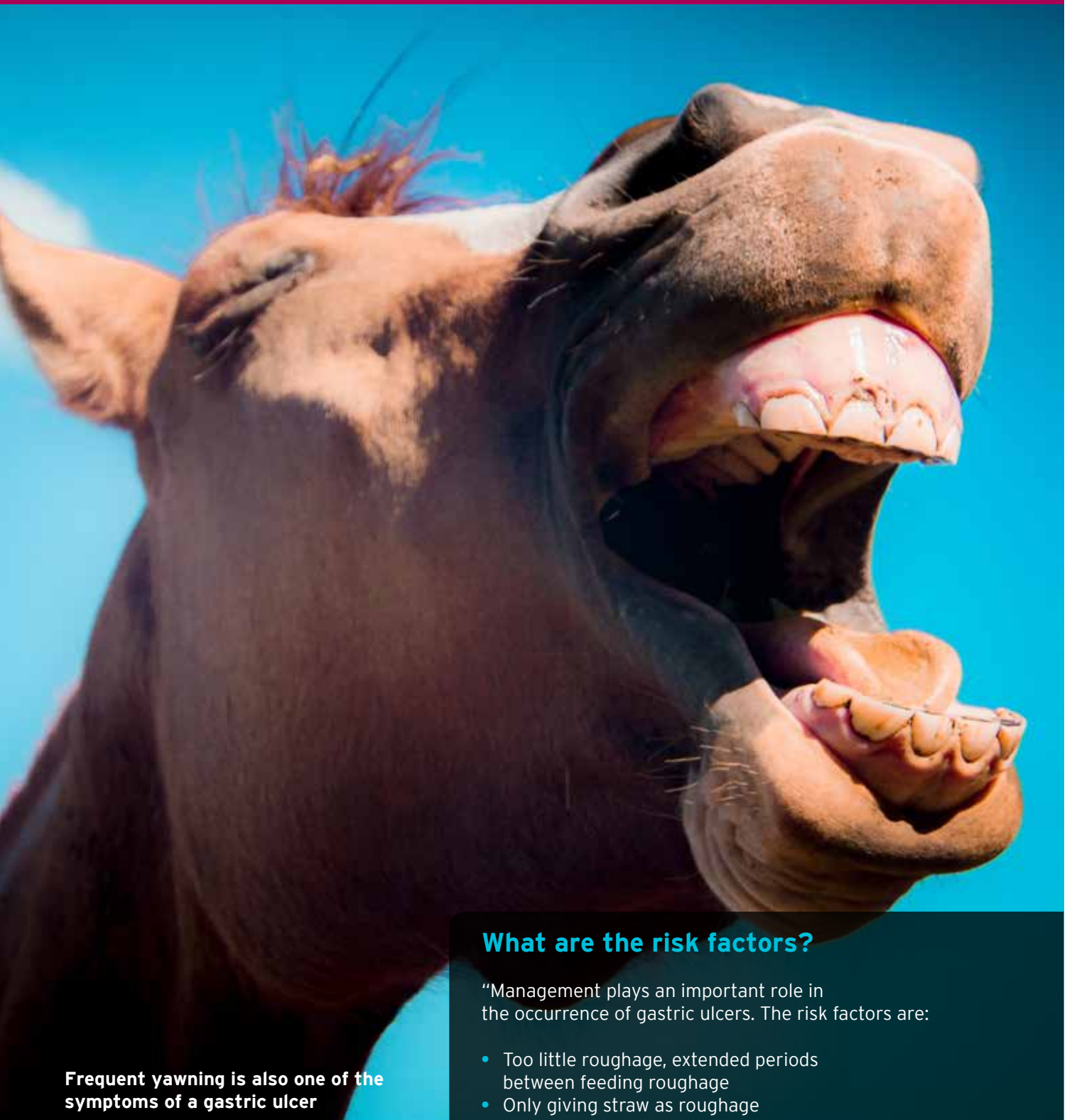
Acidity of the stomach without roughage (low pH = more acidic):

24 hours stomach pH: with free disposal of feed, grass and hay



Acidity of the stomach with free access to roughage (high pH = less acidic):

Bron: Murray and Schusser, Equine Vet J, 1993.



Frequent yawning is also one of the symptoms of a gastric ulcer

No stress please

Stress causes substances to be produced that make the stomach lining more sensitive to attack by gastric acid. Horses can experience stress when their three most important needs are not met: unlimited roughage, enough free movement, and contact with others of their species.

What are the risk factors?

“Management plays an important role in the occurrence of gastric ulcers. The risk factors are:

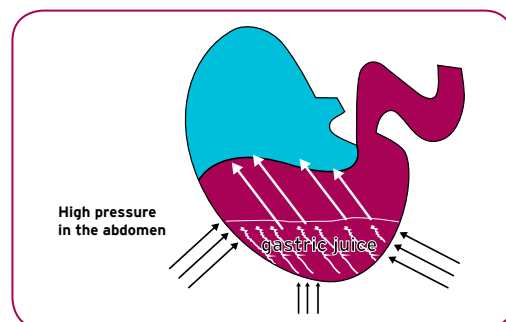
- Too little roughage, extended periods between feeding roughage
- Only giving straw as roughage
- Large portions of concentrate feed at once (more than 1.5 kg)
- Giving concentrate feed on an empty stomach first and roughage only after
- Concentrate feed that contains a lot of starch or sugar
- Extended periods without fresh drinking water
- Little or no social contact with other horses
- Little or no free movement
- Stress, for example due to transport or competitions
- Intensive exertion
- Damage caused by horsefly larvae



Training and gastric ulcers

Intensive training

Heavy exertion, for example intensive training of a sport horse, causes the abdomen, and therefore the stomach, to contract more. As a result, the acidic contents of the bottom part of the stomach come more in contact with the less well-protected upper part.



Chronic stress has been found to be an important factor in the occurrence of gastric ulcers. This can also occur if a horse cannot handle its work, meaning that the training is relatively too heavy. According to Linda van den Wollenberg, this cannot be seen separately from management. "Research has been done among racehorses in which untrained horses in the pasture had no problems with anything, but gastric ulcers developed as soon as they were put into training. This also occurs in warmbloods. But then of course there is more going on than only training. They come to the stable, get concentrate feed, are handled by people. These factors can all have an effect. It has also been shown that horses suffer more from gastric ulcers with some trainers than others. Is this due to the training methods or the management at that stable? Could be either. In thoroughbreds, genetic causes are even considered."

A horse's fundamental necessities have a major influence on the occurrence of gastric ulcers. Van den Wollenberg adds a few more points to this. "Only giving straw as roughage, or not having access to drinking water for a few hours, leads to an elevated risk. You're also asking for problems if you leave extended periods between giving roughage, give concentrate feed before a horse gets hay or silage, or give large portions of concentrate feed at once. There has even been a study that showed that stables close to urban development had more problems, but of course that could also be related to a lack of grazing."

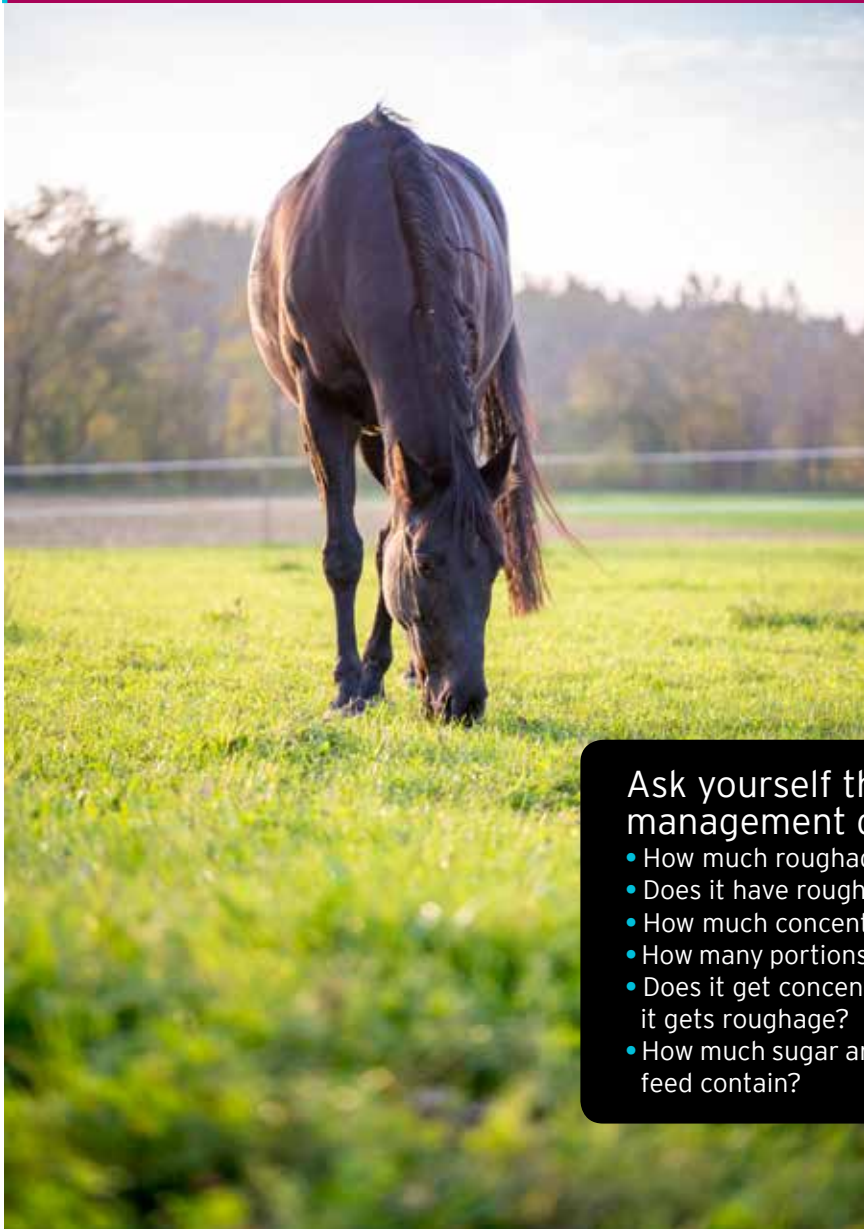
5. How quickly can a gastric ulcer form?

Gastric ulcers can form quickly. A study in which horses were denied roughage for one day showed that gastric ulcers that were not previously present were visible within 36 to 72 hours. Van den Wollenberg: "It is also a known phenomenon with colic when horses need to fast for some time due to constipation or an operation. They almost always suffer from gastric ulcers."

The formation of a gastric ulcer in pictures:



6. The approach: feed management examined



If a veterinarian finds gastric ulcers in a horse, they can be treated with medication based on the stomach protection agent Omeprazole. There are of course also alternative remedies on the market, not all of which have proven effectiveness. That is why it is best to consult your veterinarian if you suspect your horse has gastric ulcers. However, there are no two ways about it: if you don't look for the cause of their occurrence, they are sure to be back. This means that the feed management needs to be examined first.

Ask yourself the following management questions:

- How much roughage does my horse get?
- Does it have roughage to chew day and night?
- How much concentrate feed is it getting?
- How many portions is it divided into over the day?
- Does it get concentrate feed before it gets roughage?
- How much sugar and starch does my concentrate feed contain?



Veerle Vandendriessche, veterinarian and nutritionist:

Pavo equine veterinarian Veerle Vandendriessche saw a lot of this during her training in particular. Horses that were too thin and were then given extra concentrate feed, but didn't recover. "On the contrary, they just got worse. When they were examined in the clinic, we also looked inside the stomach and in 90 per cent of cases we saw serious gastric ulcers."

Part of the examination was that the total management and the feeding regime were also held up to the light. That was almost always where the problem lay. Veerle: "The logical fallacy is that more concentrate feed should help with emaciation. Horses cannot process large quantities of concentrate feed at once. Especially not if that concentrate feed is full of starch and sugar. If it is given on an empty stomach in the morning, without a roughage base being laid first, you're asking for trouble."

These horses were restored to health by adjusting the regime. This meant that the concentrate feed was completely eliminated in most cases. If it was still given, it was a type low in sugar and starch that was given in very

small portions distributed over a number of feedings. "This should mean four to six meals per day, looking primarily at the amount of sugar and starch per meal of concentrate feed. If this is too labour intensive, an automatic feeder is a good investment."

"Extra scoop of concentrate feed is the biggest mistake"

"The equine veterinarian indicates that the most important thing is to give unlimited roughage. "Grazing is best because it allows them to chew and move all day, which reduces stress. You can also consider giving alfalfa, which is rich in protein and calcium and therefore reduces the acidity in the stomach. Soaked beet pulp is also good because it contains pectin, which helps to form a protective layer. Be sure to remember the soaking part. Otherwise, you run the risk of oesophagus blockage because the pulp expands when it is saturated with saliva."

7. The solution: Pavo Ease&Excel

If you want to prevent gastric ulcers, make sure the most important needs for a horse' welfare are met: unlimited roughage, social contact, free movement. If you are afraid your horse is getting too fat, provide low-calorie roughage or use a slow feeder.

High in energy, low in starch

Sport horses that perform moderate to heavy exertion need a certain level of energy to do their work. Only roughage, however good the quality, is not always enough for this. Supplementing with concentrate feed is an obvious choice. But ingredients like grains supply simple sugar and starch, which do not have a beneficial effect on the stomach and the rest of the digestive system. This led Pavo to create a special sports feed to protect the stomach that contains almost no grain. Pavo equine veterinarian Veerle Vandendriessche: "It contains super fibres from soy, beet pulp and alfalfa. That means it is delicious and horses need to chew it for longer. It also contains a special mixture of natural ingredients that neutralise gastric acid, strengthen gastrointestinal immunity and maintain healthy gastrointestinal flora. It is high in fat which provides slow-release energy and promotes good muscle metabolism, a glossy coat and healthy hooves as an added benefit. In terms of energy, you can compare a scoop of this to a kilo of oats, with the advantage that it makes them non-heating.

Pavo Ease&Excel is intended for sport horses. Veerle: "But it is also suitable feed for the serious amateur who trains regularly."



In practice:

Marcus Ehning,
succesfull international jumping rider:



"The daily life of our sporthorses consits of competitions and long transports, that can cause a lot of stress. We tested Pavo Ease & Excel and are very satisfied."

Helen Langehanenberg,
successful international dressage rider:



"We have recently been testing Pavo Ease & Excel at a dressage horse with a sensitive stomach. He is thin and often very nervous. I was impressed with his improved condition and performance in a short time. I will definitely continue feeding Pavo Ease & Excel."



Stefan De Keersmaecker, veterinarian at DAP Equinox

As in the Netherlands, in Belgium there are also many more horses with gastric ulcers than was previously thought. Veterinarian Stefan De Keersmaecker sees a clear difference in terms of symptoms. "In horses with bleeding gastric ulcers you certainly notice something. But in milder cases there is sometimes only a slightly deviating structure of the stomach lining, and then it is often not as clear. It is something I check if horses have chronic signs of colic or are losing weight."

He is happy that horse owners are increasingly aware of the problem. "In the past, I often had to explain why I wanted to examine the stomach, now people call me up because they suspect their horse has gastric ulcers. Fortunately, there are also more veterinarians who have an endoscope at least three metres long. They need to be three metres to be able to look into the stomach." Management plays an important role in controlling stomach problems. Even in the milder cases, it is important that something is done to prevent it from becoming a more serious problem. Talking about the feeding regime is the first part of this. Dr. Keersmaecker

"Increasing awareness"

is a proponent of concentrate feed without grains, including roughage components, in which the energy for performance is derived from fats. "People want to feed their horses, but more concentrate feed doesn't work. In fact, it actually causes problems. Roughage is the solution, if necessary supplemented with an appropriate quantity of a product that is low in starch and sugars but high in fat. I examined the stomachs of several horses that are fed Pavo Ease&Excel and they looked good. I'm enthusiastic about it."



Vai Bruntink, dressage rider:

"We've had several horses that had gastric ulcers. Not anymore, because it has been treated. We are very careful about the management. For example, they always get roughage first, before we give concentrate feed. And that is divided into three small portions. But because they are sensitive to it, I give them Pavo Ease&Excel.

What we particularly notice is that they all enjoy eating it. They look great with a beautiful gloss, and they have a lot of energy without getting 'explosive'. I'm very pleased with it. By feeding Pavo Ease&Excel, I do feel I am doing everything I can to keep my horses healthy. Because I see that they are in excellent condition with this feed. I am also considering using it for other horses."

"I feed it preventively"





Twan Wolters, international racehorse trainer:

"Racehorses have to deliver so much energy that additional feeding is the only option. Large quantities of concentrate feed is risky. Trainer Twan Wolters took part in a test with Pavo Ease&Excel. He is enthusiastic. "I used it in a few horses that had extreme symptoms. After the race, they kept sweating for a long time and had a drawn-in belly. After they were switched to Pavo Ease&Excel, this decreased by as much as 300 per cent. They enjoy eating it and look good in terms of condition. But to me, it is of course ultimately about how they perform. But that is also excellent; they are doing great in the competitions." He mentions another advantage of the new product. "It is a complete feed. In the past, I had about forty bags and tubs standing around. It was always a big puzzle to make sure the horses got exactly what they needed. Now I only have to give one type of feed."

"It's great that they like eating it, but they also have to perform"



Veterinarian Stefan De keersmaecker makes a gastroscopy in the horses of Twan Wolters after feeding Pavo Ease & Excel for 3 months.

8. Conclusion

Many horses and ponies, whether in sport or not, suffer from gastric ulcers. The symptoms are usually vague, but nevertheless this has a negative effect on performance and the health of the horse. Modifying the management and a wise feed policy can prevent many problems.

Do's

✓ Give roughage

The more a horse chews the better. That is why it is important to give unlimited roughage. Also at night, because unlike us, horses do not sleep all night. If you are worried your horse is getting too fat, find a low-calorie type. Or use a hay net with small holes or a slow feeder. It is not possible to see from outside what the roughage contains in terms of nutrients.



✓ Free movement

In nature, horses move day and night. That is not the same as an hour of training with you. Calm, free movement is important for its health. Grazing is the most pleasant way for a horse to stimulate this. If that is not possible, a dry paddock or a large loose-yard is an alternative. To avoid your horse staying standing in a corner, you can offer roughage at various places in this area.

✓ Social contact

Horses are herd animals. Contact with others of their kind is very important to them. If they don't get it, this produces stress.

✓ Avoid long-term stress

A horse can handle short-term stress. It is also not always avoidable. This could be related to a visit to the veterinarian, or a collision with another horse in the pasture. Chronic stress is what can really lead to stomach problems. To avoid this, make sure the most important necessities (unlimited roughage, social contact, free movement) are met as much as possible.



✓ Contains hardly any grains

For sport horses, roughage on its own is sometimes not enough to meet their energy needs. Grains are often used as an ingredient for concentrate feed, but they are not actually very good for horses because they are high in starch and sugars. Find an alternative that provides energy from natural fats and contains ingredients that stimulate chewing.

Don'ts

✗ Large portions of concentrate feed

A horse's stomach is relatively small. It cannot optimally process more than a maximum of one and a half kilos of concentrate feed at a time. If your horse needs concentrate feed to support its energy level, give it the smallest possible portions distributed over as many feedings as possible per day.

✗ Giving extra concentrate feed

Is your horse getting thinner or is its performance disappointing? Don't just give an extra scoop of concentrate feed. It could be that your horse is suffering from gastric ulcers. Discuss your feeding regime with an expert and examine the management.



✗ Exercising on an empty stomach

Give your horse roughage first, before giving it concentrate feed. The large amount of saliva and the high-fibre food mash of the roughage will then provide some buffering of the gastric acid.

✗ Concentrate feed for exertion

It is best only to give concentrate feed after the exertion. If you exercise your horse within two hours after feeding, its blood sugar level will be relatively low, which is precisely when it does not have energy. Horses chew on concentrate feed for a relatively short time, as a result of which the stomach acid is not very well buffered when this food mash gets into the stomach. Intensive exertion causes the stomach to contract, as a result of which the acid low in the bottom half can come into contact with the less well-protected top half. Hay before exertion cannot do any harm because a horse needs to chew on it much longer and therefore less can be taken in at once.

✗ Long time without chewing

Do not leave your horse without roughage for an extended period of time. Also provide roughage when you are going to a competition. An added advantage: chewing helps reduce stress.



Management checklist

- ❑ Unlimited roughage (including at night) – possibly in slow feeder
- ❑ First roughage, then concentrate feed
- ❑ Grain free concentrate feed, divided into small portions
- ❑ Stimulate chewing of concentrate feed by adding [Pavo Daily Plus](#) or [Pavo Speedibeet](#)
- ❑ Constant fresh drinking water
- ❑ Parasite treatment (always in consultation with your veterinarian)
- ❑ Social contact with other horses
- ❑ At least four hours of free movement per day

Checklist for competition:

- Take a slow feeder or hay net with roughage to feed during transport and in between times (do not hang too high to avoid choking)
- Do not give concentrate feed within two hours before performance
- Bucket/jerrycan for drinking water



10. Colophon

This background story was created with the help of the following experts:

Internist Dr Linda van den Wollenberg from GD Animal Health in Deventer
 Veterinarian and nutrition expert Veerle Vandendriessche
 Nutritionist Rob Krabbenborg
 Veterinarian Stefan De Keersmaecker from DAP Equinox in Kasterlee, Belgium
 Professor Sloet from Utrecht University
 Dressage rider Vai Bruntink
 Racehorse trainer Twan Wolters

With thanks to Zoetis for the use of images and charts.

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B.W. Sykes, M. Hewetson, R.J. Hepburn, N. Luthersson, Y. Tamzaki

This whitepaper was made possible in part by: Pavo

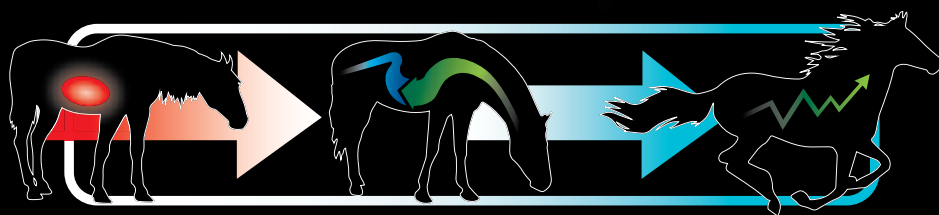
Pavo

Ease & Excel



INNOVATIVE BLEND

TO SUPPORT GASTRIC FUNCTION



- ☑ High energy, high fibre performance feed
- ☑ Supports gastric function
- ☑ Faster recovery of muscles after exercise

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