

# Trainer

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THE QUARTERLY MAGAZINE FOR THE TRAINING AND DEVELOPMENT OF THE THOROUGHBRED

## FAMILY BUSINESS

Greg and Vickie Foley share the joy of  
Hog Creek Hustle's Grade 1 success



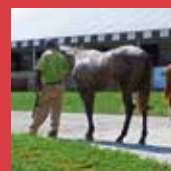
THE  
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MAGAZINE  
OF THE



WHY CONTINUING  
EDUCATION IS  
GOOD FOR TRAINERS  
AND RACING



IS FUNGI  
THE INVISIBLE  
HEALTH RISK?



THE RELATIONSHIP  
BETWEEN A HORSE'S  
PEDIGREE AND ITS  
CONFORMATION

# FUNGI

## THE INVISIBLE HEALTH RISK

Dr. Emmanuelle van Erck, DVM, PhD, ECEIM explains her work looking at the link between the presence of fungi and lower airway inflammation

**H**orses are incredible athletes. Their physiology—the way their body functions—is truly fascinating. They can adapt to training at a phenomenal rate, they have massive hearts that fuel their powerful muscles and pushes them to peak speeds. So what could stop them? Oxygen, or rather the lack of it. Horses experience hypoxemia during racing, which means they enter a state of deficiency in oxygen. The reason for this deficiency is a failure of the respiratory system to effectively ventilate and adequately fuel oxygen to the muscles. Horses are obligate nasal breathers and were endowed with particularly long and narrow upper airways in relation to their body size. These factors increase the resistance to breathing. They are also constrained by the fact that they ventilate at very high rates, which does not allow for effective and rapid renewal of oxygen in the lungs. Even the fittest, best Thoroughbreds crave oxygen from mid-race onwards. So maintaining horses in optimal respiratory health is absolutely essential for them to achieve an efficient sprint and optimal performance.

Respiratory diseases are highly prevalent in horses. It is inherent to their living and working conditions. The mere fact that a horse is housed in a box increases his risk of developing airway inflammation. The content in fine dust is naturally high in a horse's box. Closed or poorly ventilated barns further deteriorate air quality in the horse's immediate environment. Several studies have shown that horses housed indoors are exposed not only to high amounts of organic dust and ammonia but also germs and endotoxin they produce that trigger a detrimental reaction from the immune system. The problem is that even low-grade respiratory diseases will directly affect the horse's capacity to perform and recover from strenuous exercise.

With my colleagues, Dr. Dauviller and Dr. ter Woort, specialists in equine internal medicine, we have investigated the link between the presence of fungi and

lower airway inflammation. In our ambulatory referral practice, we go out to the stables and have the opportunity not only to examine the horse but also attentively assess his environment. As we collected respiratory samples and analyzed them ourselves, we became aware that the presence of microscopic molds or fungal elements was frequently associated to lung issues. To investigate this further, we decided to systematically record clinical and environmental data and link it to our findings in the respiratory samples of the horses referred for investigation.

We collected more than 700 cases; the horses included in the study were either referred routine examinations, unexplained poor performance or respiratory symptoms such as coughing or breathing heavily during exercise. All horses had a tracheal and a bronchoalveolar lavage done, which allowed us to evaluate their level of respiratory inflammation, as well as estimate the presence of fungi within the airways. We also looked at the state of activation of fungi: if they were inert particles or if they showed signs of active proliferation. Our results were without appeal; the presence of inhaled fungi significantly and negatively affected respiratory health in horses, causing inflammation and in some cases, infection.

In this population, inflammatory airway disease (IAD) was diagnosed in 88% of cases, confirming that respiratory inflammation is very common and often under-diagnosed. Of these positive cases, 81% had evidence of fungi in their airways. The presence of fungi more than doubled the odds of having lung inflammation.

The effects of inhaled fungi have been well described in human patients but not as extensively studied in horses. The fungi constitute very small dust particles that are easily inhaled into the deeper areas of the lung. The inhaled fungi can cause inflammation of the airways by their mere presence or trigger an allergic reaction in sensitized individuals. Some fungal species will produce toxins, which can exacerbate the damages caused to the respiratory system. Furthermore, when the immune system is overloaded, some fungi will start invading the

 Dr. Emmanuelle van Erck  Rose Lewis, Dr. Emmanuelle van Erck

Microscope picture of a germinating fungal spore in a respiratory sample, an indication of inhalation of fungal spores in the airways and subsequent infection from the mold.



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airways and cause infection. In our study, the horses that had fungi were more frequently affected with poor performance. More obvious respiratory clinical signs such as nasal discharge or coughing were not systematically observed. Some specific fungal species, such as *Aspergillus* type molds, were more frequently associated with lung bleeding (exercise-induced pulmonary hemorrhage).

When we looked at the link with environment, it was obvious that its hygienic quality was determinant. The use of certain types of bedding and forage were major risk factors. The use of straw bedding and dry hay constituted the highest risks of inhaling fungi and more than doubled the odds of having IAD. Soaking hay and the use of haylage also came out as detrimental. On the other hand, steaming hay at high temperatures (with a Haygain machine) was the only means to effectively reduce risks of IAD. Likewise, the use of wood shavings was protective against fungal inhalation and IAD.

Where do these fungi come from, and how can we evict them? When straw and hay are harvested, they are left to dry for a couple of days on soil. If the summer is humid, fungal content in soil is higher and the risk of contamination of the harvested hay and straw by fungi is increased. Subsequent storage of hay and straw can further promote fungal growth if temperature and humidity are favorable. Soaking hay has been shown to increase bacterial and fungal growth, whereas steaming hay effectively kills any deleterious microorganisms present in the forage, fungi included. Only hay steamers that provided high temperature steaming, right to the core of the bale, were used in the study.

Homemade incubators were exceptions but were unsafe as they did not steam at sufficiently high temperatures and served as incubators, multiplying microbial content



instead of reducing it. Haylage did not come out as a protective factor probably because of the very variable quality of the bales that were used. In terms of bedding, wood shavings were the best option, as they are produced in a non-contaminated environment wrapped up in plastic. Wood also contains natural antiseptic compounds, which would prevent microbial growth.

So reducing the introduction of fungi in the stables by choosing the right forage and bedding is key to ensuring respiratory health of our horses. The problem is that the fungi we are concerned with are microscopic, meaning invisible to the human eye. Unless you have overwhelming proliferation, such as black mold on your stable walls, or hard evidence by having the environment sampled by an expert, these fungi will remain undetectable by sight or smell. It is problematic for both the equine athlete and the persons working in the stables. Once introduced in



the environment (storage areas and box), fungal spores can persist for hundreds of years. To eliminate them and avoid contamination of fungal-free bedding and forage, regular thorough disinfection of the facilities is mandatory. It needs to be carefully planned, as it requires the use of chemicals that can be irritating for the horse. Once the disinfection has been effectively made, adding specific probiotics to the environment can prolong its effects. We have tested products that effectively recreate a healthy ecosystem and prevent excessive growth of potentially harmful fungi and bacteria.

There are a variety of other environmental factors that can affect horses and foster airway inflammation. These include everything from external factors such as climate and seasonal changes to internal factors, such as temperature and humidity within the stable, building configuration and ventilation, number of horses being housed. Management practices to clean can be paradoxically problematic. Human activity such as cleaning out the boxes, sweeping or the use of blowers will stir up high amounts of dust.

Our study has enabled us to prove how fungi can promote respiratory disease in horses. Horses with unexplained poor performance should be investigated for the possible implication of the respiratory system. Lung sampling can help determine if the horses have inhaled fungi and what level of inflammation is present. In addition to medical treatment, there are more global solutions that can be implemented to help affected horses through better management of the environment. Regular disinfection and the choice of adequate bedding and forage treatment can make a huge, long-term difference for the horses' health and performance. **■**



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