

breathing Room

Help protect your horse's respiratory health this winter by taking a proactive approach to airway inflammation.

Story by Lindsay Day





You're surely familiar with the situation: a horse that's been racing well suddenly starts to go flat in the last quarter. They're not sick, persay, but endoscopy shows excess mucus in the trachea. Or, a virus has gone through the barn in the last month or so and there's one horse that just can't seem to shake that cough.

Maintaining healthy airways in the racehorse is a priority for any trainer or owner. Even low levels of airway inflammation, which might go undetected in the pleasure horse, can significantly affect racing performance by a number of seconds.

While airway inflammation can have many causes, it's generally agreed that environmental conditions (in particular, high levels of dust) play a key role in perpetuating – if not initiating – the condition. Genetic predispositions may make some horses more vulnerable to environmental irritants, or prone to develop allergies, than others. And viruses can impair the natural defense mechanisms of the respiratory system that are used to

cope with environmental dust, prompting an inflammatory immune response that remains out of balance even after the infection has cleared. No matter what precipitating factors may be at play, however, it is clear that reducing dust exposure is good for the respiratory health of all horses.

“In the summer time we tend to have a lot of windows and doors open, and that's great, **but what happens in the winter when we close them up?**”

Stables are notoriously dusty environments. Recent studies have found that levels of dust in equine barns are often in ranges that are known to cause airway disease in people and lab animals. Given that 24-hour turnout isn't always practical or possible, improving stable air quality is a priority. Fortunately, there are a number of practical measures that can go a long way towards protecting your horse's airways from high levels of dust.

> Ventilation

A well ventilated barn can improve air quality significantly by removing airborne particles and noxious gases from the indoor environment. According to Susan Raymond, PhD., of Equine Guelph, the ideal barn ventilation system distributes fresh air uniformly throughout the building and provides fresh air without drafts, regardless of the time of year.

As Raymond points out, horse owners need to consider how the barn is ventilated in all seasons. “In the summer time we tend to have a lot of windows and doors open, and that's great, but what happens in the winter when we close them up?” This reduction in ventilation can markedly affect indoor air quality.

Airflow through a barn can be improved, however, by mechanical or natural ventilation systems. Natural ventilation takes advantage of the fact that airflow is driven by differences in temperatures (hot air naturally rises), and simply requires the installation of strategically placed permanent openings in a barn. These openings allow rising warm air to escape, typically through capped chimneys or ridge vents installed at the peak of the roof, while cooler, fresh air is continually pulled into the building, through vents that can be installed below the eaves, above windows and doors. Vent design and baffling can reduce drafts and prevent moisture from getting in the building. In barns with a closed loft above the stable area, chimneys should be insulated as they pass through to ensure that the rising warm air doesn't cool and drop back down.

Mechanical ventilation is another alternative and may involve the installation of

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exhaust fans or a duct system. While mechanical ventilation systems tend to be more consistent, they are generally more expensive to purchase and install, and require a continuous power source as well as routine maintenance. “There are pros and cons to each system,” says Raymond. “You have to examine what works best with your own farm.”

An open concept barn design also assists in improving interior air circulation. “Stall partitions that stop short of the ceiling and stall doors that are either grilled at the top or open to the aisles definitely allow better air circulation and

improve air quality within the barn,” explains Raymond.

Finally, as Raymond emphasizes, ventilation and insulation must both be considered together. “If you have a well insulated barn that is not ventilated, you are going to have a very damp barn with a lot of condensation, which is essentially an unhealthy barn. Conversely, in a well ventilated but poorly insulated barn, you are going to have a lot of extremes in terms of temperature.”

> Hay

It is well established that of all the feeds used for horses, hay has the potential to contain the highest dust content. “Simply because it is plant material,” explains Raymond, “you are always going to have some dust associated – even with good quality hay.”

And this dust is dispersed right into the breathing zone of the horse as they eat. “Those first couple of bites a horse takes, when they pick up a flake and pull backwards and shake it – that can generate very high quantities of dust right around the horses nose,” explains Melissa Millerick-May, PhD., of Michigan State University’s Equine Pulmonary Laboratory. “Those particles tend to stay

suspended in the air and the horses nostrils are essentially like great vacuum cleaners sucking it all in.”

“Millerick-May’s research has focused on measuring airborne particle concentrations in stables using aerosol photometers. These devices are capable of detecting and quantifying extremely small dust particles, less than 10 microns in diameter, that are invisible to the human eye.

“It’s actually the dust you don’t see that causes the problem,” explains Millerick-May. “It’s the stuff that’s of the size range that is likely to stay suspended that tends to get down into the lung and cause the most difficulty.

“We found that good quality hay, after being stored through the winter, produced particle concentrations around the nostril while eating that were two to three times the short term dust exposure limits set for people in an occupational setting,” says Millerick-May. “Hay that the horseperson would consider dusty, but not mouldy, topped the particle counters out and actually shut them off.”

Fortunately, according to Millerick-May’s findings, simply sprinkling hay with water before feeding can cut down particle concentrations in the horses breathing zone by more than half. Soaking hay has also been shown to achieve similar results. In either case, hay must be consumed before it dries or the airborne release of particles will reoccur. Steaming is another option, particularly for small quantities of hay, and can be achieved by pouring a kettle of boiling water over hay that is in a container with a lid and allowing it to sit for a few minutes.

The way hay is handled and fed is also important to consider. “We found that throwing hay over stalls or dropping hay into stalls from a loft generated a remarkable amount of dust,” says Millerick-May.

Ideally, hay should be stored in a separate location and delivered to the stall in ways that don’t involve dropping it from above. As a horse is designed to eat from the ground, hay should ideally be fed at this level, rather than in haynets, which require the horse to eat with an unnatural head position.

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> Bedding

When it comes to bedding, straw is generally found to be dustier than other options such as wood shavings, shredded paper or peat moss. However, variations in the quality of a given type of bedding can be significant. “The ideal bedding is low dust and free of mould,” says Raymond. “As with hay, it should ideally be stored in a separate location.”

When horses are shipped out for period of more than 24 hours, bedding in the stall should be removed. Millerick-May’s assessment of airborne particle concentrations found that any movement in a stall with bedding that had been left to sit for 24-48 hours liberated very high quantities of dust. “We recommend that the stall be stripped. If the bedding is clean it can be taken out and used to supplement other stalls.”

> Barn Chores

Many day-to-day barn chores can further contribute to poor indoor air quality. Dust levels in a stable tend to fluctuate throughout the day, with the highest levels found during periods of increased stable activity like feeding, mucking and sweeping.

The number of stalls, level of ventilation, type of bedding and number of people working at a given time can all

significantly affect the dust levels generated. Studies in different barns have shown anywhere from 2 to 20-fold increases in airborne particle concentrations during mucking. In one racing stable with poor ventilation and 16 stalls, a 45-fold increase in respirable dust concentrations was found.

Horses should be turned out during mucking, and when this is not possible, removing them from the stall and putting them in cross-ties or in another stall can help reduce their exposure while their stall is being cleaned.

Raking and sweeping aisle ways also produces large quantities of dust. While the larger particles that you see in a dust cloud will eventually settle, it’s the smaller particles that remain suspended that pose the real threat. “Fortunately, a little bit of water can go a long way,” says Millerick-May. “If you just sprinkle a little bit of water in the aisles before sweeping, it dramatically reduces the airborne concentrations of dust.”

Finally, Millerick-May suggests it’s important to reduce exposure to the fine particulate matter from exhaust fumes – vehicles should not be left running in close proximity to the barn and tractors and ATVs should always be turned off when inside.

> When the dust settles....

Minimizing dust exposure is a priority in maintaining healthy airways, especially amongst racehorses, which have such high demands placed on their respiratory systems.

“As horse owners and caretakers we have a lot of responsibility, and with that is a lot of power,” say Raymond. “With education, knowledge and experience there is a lot the horse owner can do to significantly improve the environment the horse is in.” **T**

5 WAYS TO CUT DUST:

Consider ventilation in all seasons.

Permanent openings should be installed to achieve sufficient airflow when windows and doors are closed. Remember insulation and ventilation work together.

Wet hay before feeding.

Even good quality hay can produce large amounts of dust around the horse’s nostrils while they are eating. Sprinkling hay with water can reduce the dust by half.

Turnout horses while cleaning stalls.

If this isn’t possible remove the horse from the stall and put them on crossties or in an empty stall further down the aisle.

Sprinkle the barn aisle with water before sweeping or raking.

It’s not just dust you see that you need to consider – tiny particles invisible to the human eye can stay suspended for hours.

Reduce exposure to exhaust fumes.

Don’t leave vehicles running in close proximity to the barn and turn off tractors and ATVs when you are inside.

PROBLEM

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