What a Waste!

Each year, the average horse generates eight to 10 tons of manure. Are you disposing of the waste responsibly and legally?

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Wake up, horse owner! Ever think about what happens to your horse's manure after you spread it on pastures or make mountains of it around your farm? Manure isn't the best dinnertime topic, but it's an issue you might find yourself needing to discuss soon. The federal government is concerned about how you're managing your horse's manure. Read on to be sure you are complying appropriately and responsibly with the Environmental Protection Agency (EPA).

The New DealWhere does all that manure and bedding go?

On February 12, 2003, the EPA decided to include horse operations on its watch list regarding concentrated animal feeding operations (CAFOs) and nutrient management. Effective April 12, 2004, this new regulation brings a number of concerns to the horse industry. As defined by the EPA, horse farms fall into one of three categories: large CAFOs, medium CAFOs and small CAFOs.

Large CAFOs, operations having 500 or more horses stalled or in confinement, and medium CAFOs, facilities with 250 to 499 horses stalled or confined, must meet the EPA's reporting requirements.
Horses are counted if they are confined for 45 days or more in a 12-month period. Operations with less than 250 animals, small CAFOs, will not be regulated unless they are identified as a "polluter." Small CFOs may volunteer to be included under the regulations. Regulations will be enforced by individual states.

A key part of the regulations is what we call nutrient management – or managing the nutrients that are found in horse manure. The nutrients of primary concern at this time are phosphorus (P) and nitrogen (N). EPA regulations require that nutrients excreted within the operation be controlled so that they do not pollute the environment. Runoff to state waters is of major concern, but ground water will be monitored as well.

Large Equine Operations

Nutrient management has become a way of life for dairies, cattle feed lots, and swine and poultry feeding operations. Although nutrient management is not a simple matter for these operations, it is less complex than most equine enterprises because most dairies and feeding facilities have a large group of similar animals under a single management system. In contrast, equine facilities will often have a large diversity of management systems.

Equine CAFOs are typically racetracks, training centers, show facilities and large breeding operations. The facility management can control waste management, which is one aspect of nutrient management. However, managing nutrient intake and thus excretion is controlled by horse trainers and stable managers. Racetracks, training centers and show facilities often have multiple animal management programs. For example, if 2,000 horses are stabled at a racetrack, there might be 100 trainers managing, on average, 20 animals each.

On the other hand, the breeding farm may have all of its animals on specified feeding programs, but the diversity of animal groups and seasonal changes make nutrient management a challenge. Let us look in greater detail at some examples of equine operations.

Racetracks & Training Centers

These facilities are characterized by a high concentration of horses that are stalled most of the time. Most of these facilities stable 500 to 2,000 horses for specific periods of time each year. Some operate year-round, but most have seasonal use for 45 to 180 days per year. Racetracks generally have no turn-out areas. Some training centers will have turn-out paddocks that can accommodate a portion of the horses. Few can allow turnout for all of the horses every day, but some of the horses will get two to four hours of turnout daily. This means that most, if not all, of the urine and fecal material is deposited within the stall and must be removed daily, along with bedding material. In most locations the bedding material is a high-fiber, low-moisture product that is locally produced and locally available. Bedding materials might consist of either straw, pine shavings, peanut hulls, tobacco stems, shredded paper or cardboard. These materials all have a high carbon-to-nitrogen ratio, but are quite different in their physical characteristics. Managing the nutrients included in the manure is difficult when the output from the animals is highly variable.

Nutrient intake, and consequently nutrient excretion, is managed by the trainer responsible for the care and feeding of the horses. These individuals in charge of the horses are usually less concerned about the environment than they are about optimizing the nutrient intake of their horses. They are seldom interested in the minimum amount of a nutrient necessary for the animal and are more concerned about keeping the animal eating and optimizing the nutritional status of the animal so that nutrient intake does not limit performance. Variability in nutrient intake can be illustrated by looking at the extremes in feeding programs (Table 1).

table 1

All of the programs in Table 1 meet or exceed the National Research Council (NRC) (1989) recommendations for animals in race training. Program 3 exceeds protein recommendations by 36 percent, calcium

recommendations by 109 percent, phosphorus requirements by 39 percent, and copper requirements by 97 percent. The other programs are closer to the recommendations, except for copper, which is 142 percent above the recommendations for Program 1. Because the NRC (1989) recommends a specific nutrient level for a group of horses, it does not mean that the animals will not benefit from a higher intake. Consequently, most trainers exceed many nutrient recommendations because of perceived or real benefits to the animal.

Although young horses deposit nutrients in their muscles (protein) and bones (calcium and phosphorus) as their training progresses, mature horses (three years and older) do not store nutrients and will excrete all of the mineral elements they consume. Therefore, the challenge is to find a home for everything we feed the horse. In the examples above, we need to manage 200 to 261 grams of nitrogen and about 36 grams of phosphorus daily for each horse. For a training facility with 2,000 horses, this would be 400 to 522 kilograms of nitrogen and 72 kilograms of phosphorus daily. Granted, some of the nitrogen will not be trapped because it is released as ammonia into the atmosphere. The remainder of the nitrogen and phosphorus will be included in 9 to 11 pounds (4 to 5 kilograms) dry feces (10 to 15 kilograms wet feces), 10 to 15 liters of urine and 22 to 33 pounds (10 to 15 kilograms) of bedding.

Manure Management

Because most racetracks and training centers do not have adequate land to use for recycling manure nutrients, all of the manure must be transferred to a third party. However, this does not release the center of its responsibility for that material. Records must be kept and submitted to the regulating agency documenting how much material was transferred, its nutrient content and to whom it was transferred. Care must be taken to properly handle the material from collection until it is removed from the site, in order to minimize the opportunity for ground and surface water contamination.

Show Facilities

The nutrient load from a show facility is even more variable. If the facility handles 400 horses for a weekend show, virtually every animal will be on a different feeding program. Therefore, the nutrient excretion will be even more variable than cited in Table 1. In addition, stalls are usually stripped after each show so there will typically be more bedding per animal at this type of facility. These facilities have the same challenges as the racetracks and training centers cited above.

Breeding Farms

Breeding farms present a different challenge. There will likely be a variety

of animal groups including stallions, gestating mares, lactating mares, suckling foals, weanling foals, yearlings, horses in training and maybe some older horses that do not fit in the previously mentioned groups. This is complicated by the fact that all of these groups will not be present all of the time and their feeding programs are influenced by seasonal changes because most are managed on pasture. This brings up another variable. Although the horses are stalled enough to categorize the farm as a CAFO, many of the animals spend most of their time on pasture. Some might be stalled all night and some might be stalled all day, but most are only stalled for feeding. Nevertheless, the manure that is deposited in the stalls and dry lot paddocks must be managed. Typical nutrient intake levels for animals on this type of farm are shown in Table 2.

In most commercial breeding farms, mares foal between January and June. If the mare is due to foal in March, she will be in late gestation from January 1 until parturition. In most locations she will be on a concentrate and hay program during this time. She will likely be stalled or confined at night during the latter part of the period because it is desirable to be able to closely monitor the mare as she approaches parturition. Lactation is divided into early (first three months) and late (fourth month to weaning) periods.

The early period (March, April, May) is usually a forage transition period, during which the mare changes from a hay program to a pasture program. During late lactation (June, July, August) the mare and her foal are usually on pasture. During both of these periods the mare and foal are likely to be on pasture except when stalled for feeding and other routine activities such as waiting for the farrier or the veterinarian. Because most mares receive limited stalling during spring and summer, only 10 to 25 percent of the fecal and urinary output will be deposited in stalls. After weaning, the mare, hopefully in mid-gestation of her next pregnancy, is usually on pasture until forage quality or quantity will not support desired body condition. The mare is then fed hay and some concentrate. Matching the mare’s nutrient intake to her requirements is therefore a function of selecting the appropriate concentrate that will properly supplement the forage and feeding to sustain desired body condition. The farm may feed a single concentrate to the mare throughout the year, only varying the amount to meet the mare’s energy needs, or it might feed two concentrates, one to match the hay program and one for the pasture program.

Growing horses are fed concentrate and pasture during the pasture season and concentrate and hay in the winter and whenever the animals are confined to prepare them for sale or show. The extreme situation is horses competing strictly in halter classes. These animals are confined

most of the time, perhaps getting limited turn out in the evenings or at night. Most young growing horses will be fed concentrate at 2.2 to 3.3 pounds per 220 pounds of body weight daily, along with all of the pasture or hay they want to consume. Most of their nutrient excretion will be in the stall.

The primary variable in both the mare's and the foal's feeding programs is the choice of hay. Because most farms are restricted in their choice of pasture by which crops grow in the area, the only choices the farms have is what hay to feed and what concentrate to supplement the forage. The hay becomes the biggest variable in dictating the nutrient intake and excretion. Table 2 illustrates the expected variation in the nutrient intake of mares, weanlings and yearlings fed a grass hay and a legume (alfalfa) hay. Protein intake (N) is almost always higher for the legume-based forage programs. On the other hand, phosphorous intake is quite consistent on all of the programs. However, unlike the mature horse in training, these two animal groups do not excrete all of the nutrients they consume. Some are deposited as muscle and bone and some are secreted as milk for the foal. Therefore, these animals release fewer nutrients into the environment than their counterparts in training. Of the 1569 grams of protein required by the mare each day during early lactation, 346 grams will be secreted in the milk. Of the 40 grams of phosphorous required by the mare each day, 12.4 grams will be secreted in the milk. Thus the potential excretion of nitrogen and phosphorous are less than would be evident from the animal's intake. A similar relationship exists in the mare in late gestation and in the growing foal, due to tissue deposition.

Table 2

Too many nutrients?
Feeding excess nutrients should be avoided for several reasons. First, feeding excess nutrients is expensive. Those nutrients are wasted by the animal, so they do not benefit the animal, and they could adversely affect the efficiency with which other nutrients are utilized. Second, excess nutrients increase the nutrient loss to the environment, making nutrient management more difficult.

Why, then, do so many of us feed above the NRC (1989) recommendations? The science is still weak. Although recommendations for some nutrients might be very close to what the animal requires, the data available on the needs of other nutrients is still very limited. A safety factor is justifiable because the data is limited. We also have considerable variation in the digestion and metabolic efficiency of animals. Just as people vary in how they utilize nutrients, horses also vary.

The final justification is variability in forage. Forage nutrient content varies with season, maturity, fertilization programs and moisture levels. If forage is harvested for hay, its nutrient content is influenced by harvesting and storage conditions. Thus, some increase in supplementation might be necessary just to compensate for the variation experienced on the farm. However, it is hard to justify feeding 25 to 70 percent more protein (nitrogen) than the animal requires. High alfalfa diets almost always result in nitrogen intakes considerably above the requirements. Care should be taken when planning programs using alfalfa to evaluate the need for this high-protein product and keep its use in line with the animal’s needs and our need to protect the environment.