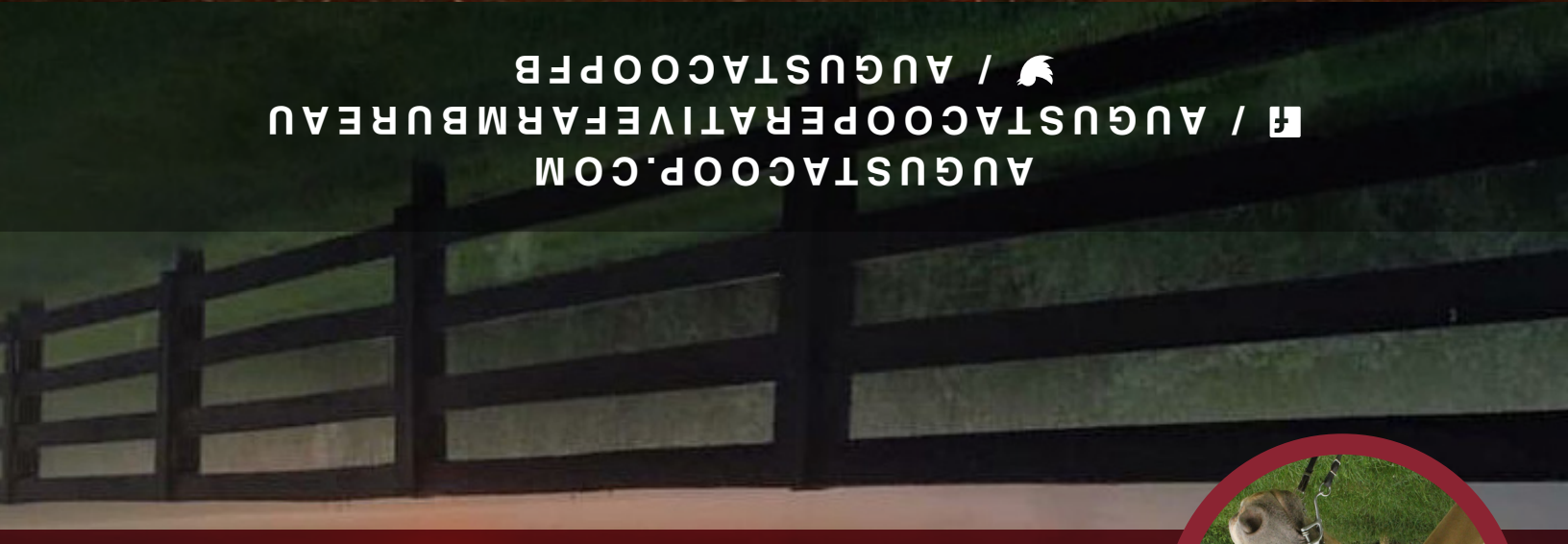
SINCE 1929

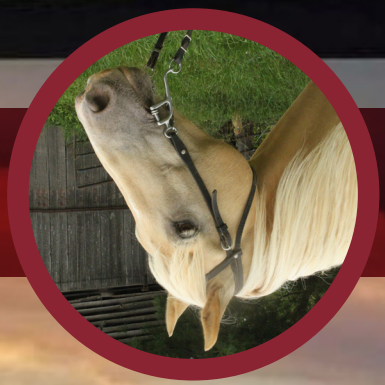
Augusta Cooperative FARM BUREAU, INC.

PRST STD
U.S. Postage
PAID
Permit No. 80
Staunton, VA

AUGUSTA COOPERATIVE FARM BUREAU, INC.
1205B RICHMOND RD.
STAUNTON, VA 24401

AUGUSTACOOP.COM
/ AUGUSTACOOPERATIVEFARMBUREAU
/ AUGUSTACOOPFB





AGRONOMY & EQUINE EDITOR

November 2025

SINCE 1929

Augusta Cooperative FARM BUREAU, INC.

LIMING AND FERTILIZING HORSE PASTURES

Maintaining optimal pH and soil fertility are essential steps to managing a productive horse pasture

Soil fertility is often overlooked on horse farms, but it is one of the most fundamental aspects of pasture health. You pay close attention to your horse's nutrition so it can perform its best and live a healthy life, and your pasture grasses need the same care if you want them to provide nutritious feed for your horse. Pasture plants that are deficient in nutrients may grow poorly, be discolored, or even die. However, blindly applying lime and fertilizer every year is also not the best approach for environmental and financial reasons.

The first step in any pasture improvement is proper soil testing. Take representative samples (many subsamples mixed together) of your fields and send them to a laboratory to be analyzed. For instructions, see Don't Guess, Soil Test. Soil tests should be repeated every 3 years.

The results will tell you all about your soil fertility. Specifically, they will state how much limestone (lime) you need to adjust your soil's acidity and how much fertilizer nutrients you need to feed the forages. Let's look at each of these individually.

Limestone

Lime is used when soil is too acidic for optimal plant growth. We measure acidity using the pH scale; numbers below 7 are acidic, 7 is neutral, and numbers above 7 are basic (or alkaline). Different plants grow best under different pH conditions, and pasture grasses thrive in pH 6.0-6.5. Legumes like alfalfa and clover thrive in pH 6.5-7.0. We generally try to maintain pastures around 6.5. What may seem like a small shortfall (5.8 instead of 6.5) is actually a big difference that will affect your forages. Additionally, if your soil is too acidic, then any fertilizer application will be less effective.

The soil test result will state how many pounds of lime to apply over a 3-year period. The recommended amount is not meant to be applied annually. Lime is generally needed in very large quantities, like tons per acre. Therefore, it is usually most economical to hire someone to apply this for you rather than buying it by the bag. Large chemical companies can send a lime truck to treat your fields; however, this doesn't always work out on smaller farms and pastures with narrow lanes and gates. Some companies may drop off a cart full of lime that you spread with your own tractor. Ask around to find out who your neighbors and other horse farm owners use.

Ag lime (calcium carbonate) is not toxic to horses. However, the product can be quite dusty if it is finely ground. You should leave horses inside when the product is being applied if it is dusty. A small amount of rain or even morning dew should be sufficient to reduce the dust.

Different lime products have varying quality when it comes to neutralizing soil acidity. The product will have a number on the label: Calcium Carbonate Equivalent, or CCE. This number standardizes how effective the product is, compared to pure calcium carbonate (100%). A product with CCE below 100% will be less effective and require more product for the same result. A product with CCE above 100% will be more effective and require less product for the same result. A similar number is Effective Neutralizing Value (ENV), which also considers the fineness of the lime material. Read more about lime and CCE here: Soil Acidity and Aglime.

Lime can take a long time to neutralize soil acidity, especially when it is not finely ground and when it is not mixed into the soil. It can take 6-12 months for surface-applied lime to do its job in the root zone of grasses! However, it is one of the most cost-effective ways to improve a pasture with low soil pH.

Pelletized lime is gaining popularity because it is easier to apply with traditional fertilizer spreaders than pulverized lime, which is a fine powder. Pelletized lime is finely ground limestone mixed with a binding agent to form pellets that break down in the soil. It is more expensive than bulk ag lime. Because the lime is so finely ground, it reacts quickly in the soil, but the neutralizing effect does not last as long. Therefore, pelletized lime can be applied in smaller amounts more frequently than ag lime. However, the same total amount of lime is needed over the 3-year period covered by the soil test.

Fertilizer

Plants need fertilizer nutrients to grow and be productive. Nutrient levels in the soil may decline over time as the plants remove nutrients to be incorporated into grass, then grazing animals remove the grass and use the nutrients for their own bodies. Fertilization replaces the nutrients that were removed. Manure can also replace some of these nutrients, but not in an even pattern and not in the ratio that plants need.

The soil test results will tell you how many pounds of nitrogen (N), phosphate (P_2O_5), and potassium oxide (K_2O) need to be applied to each field annually. Pounds of each nutrient is not the same as pounds of fertilizer, as different fertilizer products will contain different percentages of each nutrient.

If you are hiring someone to apply fertilizer for you, they should be able to read your soil test report and select a product(s) and amount that will meet the recommendations. If you want to DIY, then you will need to do some math or contact your local Extension educator.

A fertilizer product will have a grade (or a guaranteed analysis) on the bag. It is a series of 3 numbers separated by dashes, like 10-10-10. These three numbers tell you how much N, P_2O_5, and K_2O are in the product by weight. Therefore, a 50-lb bag of 10-10-10 fertilizer contains 5 pounds each (10% of the 50-pound bag) of N, P_2O_5, and K_2O. It would take

continued on page 2

continued from page 1

a lot of bags to apply 50 pounds per acre of nitrogen (a common springtime recommendation) to a pasture! For example, a 2-acre pasture would need 20 bags of this product to provide 50 pounds N/acre.

Fertilizer products used by farmers often have higher concentrations of these nutrients, such as diammonium phosphate, which has a guaranteed analysis of 18-46-0. These products can be blended to create a custom fertilizer to match your field's needs. Even organic fertilizers should have a guaranteed analysis to guide application.

There are a few things to know about each nutrient.

Nitrogen: This nutrient causes a flush of leafy growth in grasses and is an essential component of chlorophyll and proteins. Legumes like clover produce their own nitrogen in root nodules, and applying N fertilizer to a field with both legumes and grasses can favor grass growth. Nitrogen can only be used by the plant when it is actively growing, so it would be a waste to apply it in winter or hot, dry summer months (in Pennsylvania) when grasses have limited growth. The recommended amount is based solely on expected forage yield (a field on the submission form) and is intended to be split into two (or three) applications: one in spring (maybe one in summer if soil moisture is adequate) and one in fall. Do not apply the whole amount at once!

Phosphorus: This nutrient is important to many plant processes, especially root and seedling growth. If you plan on seeding new grass, it's important to make sure your soil phosphorus is in the optimal range. It can be applied any time during the growing season, and whatever doesn't get used by plants builds up in the soil over time.

Potassium: This nutrient is also vital to many plant systems and is especially important for winter hardiness. Like phosphorus, it can be applied at any time during the growing season. Potash refers to potassium-containing fertilizer compounds. If you graze ruminants, you may be familiar with grass tetany, which can occur when soils and forages are very high in potassium, causing a magnesium deficiency in animals. This does not occur in horses.

You should leave horses off the treated fields until about ½-inch of rain has fallen to wash the product off the plant leaves. Fertilizer can be applied as a granular or liquid product. Cone-shaped spinner spreaders are a common way to apply dry fertilizer and can be pulled behind a tractor or other farm vehicle. Make sure to calibrate your equipment before applying fertilizer to make sure you are applying at the rate you expect!

Hiring A Lime or Fertilizer Applicator

Sometimes, the hardest part of this process is finding someone to apply the materials for you. You may find some chemical companies that can help you by searching for "agricultural fertilizer," but they may prioritize larger crop farms and have trouble accessing small pastures with their large equipment. Word of mouth tends to be the most effective option locally. Ask your neighbors and other nearby horse farm owners who they use. Ask around at ag supply stores or even on social media in local equestrian groups.

Take-Home Messages

If you are looking to improve your pasture quality and provide more forage for your horses, addressing soil fertility needs is the first step. There is a lot to know, but these are the basics:

- Soil test every 3 years
- Lime according to test results, the recommended amount is meant to be applied once per 3 years
- Fertilize annually according to the test results:

  Nitrogen: Split the application into two and apply half in the spring and half in the fall

  Phosphorus: Apply any time during the growing season

  Potassium: Apply any time during the growing season

Penn State Extension

FEEDING GUIDELINES FOR HORSES WITH RECURRENT COLIC

Recurrent colic—the type of abdominal pain that goes away but just keeps coming back—isn't technically considered a disease itself. Rather, recurrent colic is the result of other underlying causes, such as inflammatory bowel disease (IBD), intestinal adhesions, gastric ulcers, and/or dental problems. In some cases the primary cause isn't even a gastrointestinal issue at all—such as when ovarian cysts, displaced ligaments, or chronic stress trigger abdominal pain.

Determining the Cause of Recurrent Colic in Horses

That's why the first step in managing recurrent colic should always be to take a step back and look at what pathologies might be behind it, says Alicia Long, DVM, Dipl. ACVIM (LA), ACVECC (LA), assistant professor in Large Animal Emergency and Critical Care at the University of Pennsylvania's New Bolton Center, in Kennett Square. Some causal diseases, such as gastric ulcers, reproductive system disorders, enteroliths (intestinal stones or calculi), and enteropathies (disease or damage of the intestinal tract), can be successfully treated with medications, changes in management, and/or surgery.

The underlying issue might not even be a physical disease at all but, rather, inappropriate management, adds Kris Hiney, PhD, associate professor and extension specialist in Animal and Food Sciences at Oklahoma State University, in Stillwater. "Don't forget that physiological health depends on mental health," she says. "That's super important."

continued on page 3

continued from page 2

Finding the cause of your horse's recurrent colic could take weeks, months, or even longer, says Long. When you get a diagnosis, there aren't always rapid treatment options—which is the case with spasmodic gas colic and colon displacement—arguably two of the most common sources of recurrent colic, she says. Worse, in some cases, there might not be any diagnosis at all.

In the absence of a diagnosis or targeted treatment plan, it's critical to feed the horse in a way that provides relief, our sources say. In addition, following a carefully devised plan could lead to valuable clues that help pinpoint the cause.

And although robust research is still needed, practical experience suggests a well-designed feeding regimen might even—in some cases—give the digestive system just the break it needs to heal and get back on track, Long says.

"It's sort of like resetting the system," she explains. "The hope is that it would be just an intermediate phase to then go back to more normal."

To help you understand the best ways to feed your recurrent colic patient while awaiting a diagnosis or targeted treatment, we've provided these five helpful tips.

1. Go for Low-Bulk Fiber

Horses evolved to thrive on bulk fiber such as long-stem hay and grass, and even leaves and small branches. But the digestive system—particularly the small intestine—works hard to break down all that bulk, Long says. To give the intestines some rest, she recommends feeding low-bulk fiber such as chopped hay, hay cubes, and pellets.

Based on various clinical cases she's seen, Long notes that low bulk seems particularly beneficial for horses with inflammatory intestinal conditions such as IBD. "Basically, you're making it really easy for those intestinal cells to digest food," she explains.

Made of finely ground fiber, pellets offer "the most extreme of low bulk," says Long. She's found pellets work best in confirmed IBD cases. Because hay pellets are hard, they need to be soaked for easier chewing. When the diagnosis is uncertain, horse owners can try chopped hay or cubes first, if they prefer.

Hiney says she looks out for any forage that might be "too coarse," especially when the recurrent colic patient is an older horse with dental issues. "Does he need to be on a finer stem, or perhaps less-mature forage?" she asks.

Fresh grass usually makes a great low-bulk forage, provided horses can chew it, Long says. Horses with recurrent colic can benefit from full- or part-time pasture, as long as their dental and metabolic health—particularly concerning laminitis—allow it. This approach offers the added benefit of mimicking the natural behavior of horses, which evolved to have constant access to forage and move regularly to obtain it.

While researchers haven't linked high-starch diets and recurrent colic, Long says she nonetheless recommends keeping concentrate feeds to a minimum for these horses. Any concentrates should be fed on a full stomach of forage to avoid digestive upset, she adds.

Horses with recurrent colic needing extra energy for performance or weight gain could consume fats and oils instead of concentrates, Long says. And all horses on forage-focused diets need a balancer to shore up their vitamin and mineral intake.

2. Limit Variety

Free-roaming feral horses consume dozens of plant species. But to allow an upset digestive system some rest, it's important to keep your horse's "salads" simple, our sources say.

"In general, limit the number of different ingredients you're giving your horses—

especially those whose intestines aren't totally normal from a functional standpoint," Long says.

That includes the supplements we're hoping could be helpful, as well as the treats we use for training or just to show our love. "Apples, carrots, and peppermints have simple ingredients versus processed treats," she explains.

Providing pasture in addition to stored forage (hay and hay products) also constitutes variety, says Hiney. That creates somewhat of a conundrum because, again, horses—and notably those with recurrent colic—usually benefit from fresh grass. The trick is introducing the variety slowly, increasing the amount of turnout time over a matter of weeks.

3. Scrutinize Your Forage, Pasture, and Bedding

Do you really know what's in your forage, out in your field, and under your horse's feet? Examining the composition of these food sources could provide crucial insights into what triggers your horse's colic episodes, Long and Hiney say.

Hiney recommends regularly checking your turnout areas for toxic plants such as branching ivy, sycamore maple (Acer pseudoplatanus), or buttercups.

Fence lines are likely spots for unintended plants, including weeds and poisonous species such as pokeweed, distributed by birds in their droppings. "Really look at everything that could be going on," she says. "They could all be part of the problem."

continued on page 4

continued from page 3

Grass length could also cause trouble if a horse has dental issues that prevent proper chewing. Long fibers are harder to digest.

You can work with an extension agent to evaluate your pastures and hay and help you identify any toxic plants.

Sand buildup in the digestive system can also create digestive issues, particularly sand colic. So, it's important to know if you have sandy soils and if your horse's recurrent colic might be associated with that.

Owners should thoroughly inspect their stored forage for dust, mold, coarse texture, or poor quality in general. Any of these issues could further upset a sensitive digestive system, our sources say. In addition, they need to watch for dead animals and other foreign objects that could cause disease or injury.

Finally, inspect your bedding for similar problems, and observe your horse's behavior. Is he eating his bedding? Straw contains coarse, long fibers that are difficult to digest, but bored, hungry horses, or those needing to chew or lacking long fibers in their diet, are prone to eat it, Long says.

While shavings might be a better option, some horses—especially hungry ones—eat them as well. Long says researchers have not documented any cases of horses developing recurrent colic because they consumed shavings. Even so, it's worth keeping an eye on what horses are doing with their bedding. "It sometimes requires some experimenting to keep them from eating it," she says.

4. Prioritize Consistency

Generally speaking, horses are creatures of habit. Those with recurrent colic thus face fewer challenges when they have consistent management—meaning consistent meals at consistent times of day in consistent settings.

"Often what you see with these recurrent colic horses is that they colic with changes in routine—even changes in weather," Long says. "Obviously, the weather's going to do what the weather's going to do. But if you can try to make sure that their feeding is as consistent as possible, that's going to be a big thing, too."

That routine means what time, how much, and what you're feeding—right down to the same batches of hay from the same source, she says.

However, consistency goes far beyond just feeding (and weather), Hiney adds. Susceptible horses need welfare-friendly environments that meet all their unique natural needs, such as forage, companionship, and free movement.

"My answer is always to go through all of the management first, doing all the things that are logical for the horse," she says. "People like to go first to supplements right away, but you really need to make sure your management program is where it needs to be before you start adding things on top."

5. Try Supplements and Other Changes One at a Time

Once you've examined and addressed your horse's diet and management, try adding or removing an element to see what helps—or what, unintentionally, might make things worse.

"It's a little bit of trying and seeing," Long explains.

Specifically, that means experimenting with different types of hay or pasture, feeding times, and even surroundings or nearby companions, notes Hiney.

"So, ask yourself, 'Okay, I'm changing this, did this help?' " she says. "You need to really start figuring out what works and what doesn't for each horse. Dialing into the needs of that individual horse is how we want to do it."

Supplements such as antacids, pectins, lecithins, aloe vera, and papaya might be helpful and, in fact, some probably are, says Hiney. However, the current research is too limited to provide clear recommendations.

"If you're going to do supplements, you've got to be very clinical in your approach," she says. "So don't just throw everything at them. Try one thing, then give it a good chance (at least a month) to see if it does anything before you switch."

This deliberate approach can help you determine what's responsible for improvements—management or dietary changes or the product.

Importantly, owners need to keep in mind that frequent changes could themselves trigger colic episodes in a colic-prone horse, she adds. Consult an equine nutritionist about dietary management and work with your veterinarian to create a comprehensive health plan for such a horse.

Take-Home Message

Recurrent colic threatens horses' health and welfare and causes significant stress and frustration for owners. A few helpful feeding tips can give them a chance to take a break and possibly even recover. Scientists still need to gather significantly more data before making evidence-based recommendations. In the meantime our experts advise easing the recurrent colic horse's digestive burden with consistent, simple, low-bulk forage diets and a welfare-friendly management approach, while making changes gradually.

The Horse

NO HOOF, NO HORSE - HOW NUTRITION AFFECTS HOOF GROWTH

Do nutrients affect hoof growth and quality?

There are several nutrients that can influence hoof growth and quality, but there is very little evidence to suggest that the addition of extra nutrients to an already-balanced diet will promote hoof growth in the normal horse. However, energy or calorie content of the diet can have an impact on hoof growth. Research has shown that feeding young, growing horses a lower-calorie diet that led to reduced weight gain also resulted in slower hoof growth. Protein deficiency can have the same effect as energy deficiency since hoof structure is primarily keratin, a protein. The hoof growth of weanlings fed 10 percent protein was only two thirds that of weanlings fed 14.5 percent protein (Comben, Clark and Sutherland, 1984).

Proteins are made up of different amino acids, and the amino acid concentration within the horn of good-quality hooves has been shown to be different from that of poor-quality hooves. However, a study from Geyer and Schulze in 1994 failed to show an effect of specific amino acid supplementation on the growth of hooves. While the essential amino acid methionine is thought to be important for hoof quality, if fed in excess it is thought to cause a depletion of iron, copper and zinc, which may be associated with crumbling horn and white line disease. Fats are needed by the hoof to create a permeability barrier that assists in cell-to-cell adhesion, helping prevent bacteria and fungi from penetrating the horn. Diets containing adequate levels of fat can, therefore, be beneficial to the hoof.

Mineral balance influences hoof growth and quality

A proper balance of minerals is also important to hoof growth and quality. For example, a study by Harrington, Walsh and White in 1973 showed zinc to be important in the normal keratinization of the hoof. Horses with insufficient hoof horn strength had less zinc in the hoof horn and plasma than did horses with no hoof horn damage.

Calcium and phosphorus, and the ratio of one to the other, also has an impact on hoof development. Calcium is needed for cell-to-cell attachment in the hoof horn. Calcium is also important in the metabolism of the intercellular lipids. Excess phosphorus can block the absorption of calcium from the small intestine, which ultimately can cause weak and abnormal bones and affect cell-to-cell attachment.

Selenium is important as an antioxidant for the protection of cellular membranes. However, excess selenium in the diet can lead to substitution of sulfur in the keratin fibers with selenium, resulting in poor structural integrity. Chronic selenium toxicity can result in hair loss, coronitis and bleeding of the coronary band as well as sloughing of the hoof and even laminitis.

The effect of biotin on hoof growth

The most-investigated vitamin related to hoof growth is biotin, a water-soluble vitamin that is manufactured by microbes in the digestive system. Controlled studies have reported varying results on the effect of biotin supplementation on hoof growth and quality. Some studies, such as one conducted by Schryver and Hintz in 1983, found biotin supplementation to help some horses grow better hooves, other studies found no advantage, and one study reported a reduced growth rate with biotin supplementation. The level of supplementation was 10 to 30 mg of biotin per day over a nine- to 38-month period, and improvement was observed in some but not all of the horses.

With horses that have poor hoof quality despite good environment and balanced nutrition, there may be some benefit from a therapeutic dose of biotin supplementation. But for the majority of horses, a diet with naturally occurring biotin, a good amino acid and fatty acid balance, and proper vitamin and mineral fortification will support excellent hoof growth rates and quality of growth.

There are several nutrients that can exert a direct influence on the growth rate and integrity of the hoof. It is the balance of these nutrients with each other that is most important in the growth of a normal hoof.

Purina Mills

NOVEMBER 6TH

5:30 – 8:00 PM *(after store hours)*

FRIENDS & FAMILY SALE

40% OFF ALL BOOTS & CLOTHING

All Brands

EXCLUSIVE AUGUSTA CO-OP MEMBER EVENT

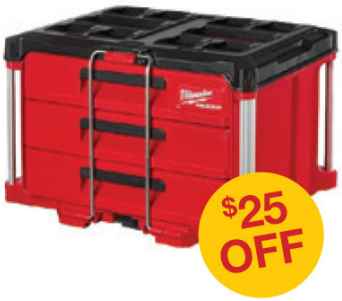
If you are a current member you are invited to this event!

PLUS DEALS THROUGHOUT THE STORE:
PET, MILWAUKEE, YETI, WILD BIRD SEED, & MORE! **STAUNTON LOCATION ONLY.**

Milwaukee®

$37.99

23PC SHOCKWAVE™ Impact Duty RED HELIX™ Titanium Drill Bit Set #48-89-4631



$174.99

PACKOUT™ 3-Drawer Tool Box
#48-22-8443

$14.99

18PC SHOCKWAVE™ Impact Duty Driver Bit Set
#48-32-4403

In-store savings on select products

EVENTS / CALENDAR

FRIENDS & FAMILY SALE (AFTER HOURS)
November 6 • 5:30 pm - 8:00 pm
Staunton location only.
40% off all boots & clothing. Plus deals throughout the store. Member only event.

BLACK FRIDAY SALE
November 7-8
Staunton location only.
40% off all boots & clothing. Open to the public.

Scan to view event details