# Fitting Teff into the Horse Diet

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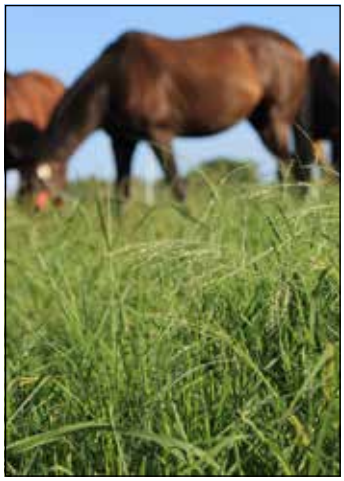

Teff may seem like an overnight success for some in the horse industry. However, teff has been a cultivated forage in the U.S. for some time. So why has teff become so popular and where does it best fit in the horse's diet? Teff is an annual warm-season grass many believe originated from Ethiopia, where it was cultivated as a grain crop for human consumption. It is fine-stemmed, fast-growing, high-yielding, seems adaptive to numerous environments, and tends to thrive in warmer, drier conditions. However, its nutrient profile is what makes it attractive.

Compared to cool-season grasses and legumes, teff tends to be higher in fiber values and lower in nonstructural carbohydrates (NSC) and digestible energy (DE). This nutrient profile makes it an appealing option for horse owners with "easy-keeping" horses, over-weight horses, or horses diagnosed with Equine Metabolic Syndrome (EMS), laminitis, Pituitary Pars Intermedia Dysfunction (PPID), or Polysaccharide Storage Myopathy (PSSM). These horses tend to require total diets lower in NSC and DE, making teff a desirable option. Elevating teff's popularity and demand is the rate of obesity and related issues (e.g., EMS and laminitis) in horses. Similar to human and companion animal populations, obesity in the horse population is estimated at 30%, requiring many horse owners to seek lower caloric feedstuffs. However, what does research say about fitting teff into horse diets?

University of Minnesota researchers have explored the impact of horses grazing teff. They found it produced less season-long yield compared to alfalfa and perennial ryegrass, primarily due to fewer grazing events. Since it is a warm-season grass, it must be planted later in the spring when soil temperatures are warmer and is more easily killed by cooler fall nights compared to cool-season grasses.

Teff was also confirmed to have higher amounts of fiber and lower amounts of NSC, DE, and crude protein (CP) compared to cool-season grasses and legumes. The combination of higher fiber values, which tend to slow intake, and lower NSC values have been reported to decrease the glucose and insulin response in horses. Similar to humans, maintaining a more level (or homeostatic) insulin response is thought to be desirable to overall health, especially in horses diagnosed with metabolic diseases like EMS. Researchers found blood glucose and insulin values of horses grazing teff, cool-season grasses, and legumes were not different in the spring and summer; however, they were lower when horses grazed teff in the fall and late fall (September and October) compared to horses grazing cool-season grasses.

Fall grazing tends to be risky for horses diagnosed with metabolic diseases as warm days and cool nights lead to spikes in NSC in cool-season grasses. Although teff was lower in DE, if consumed at 2.5% bodyweight on a DM basis daily, it met DE requirements of adult horses at maintenance. Additionally, when a more detailed amino acid analysis was conducted, researchers found that while alfalfa and cool-season grasses had greater concentrations of most amino acids, horses grazing teff had similar blood amino acid responses compared to other forages. This suggested the lower CP values found in teff were not detrimental to the mature, idle grazing horses. Finally, teff did tend to have a slightly inverted Ca:P ratio, making it essential to test teff for forage nutritive values and supplement with Ca when necessary.

Several universities have also explored adult horse preference when feeding teff as hay. When harvested under ideal weather conditions and maturity, most describe teff hay as fine-stemmed and leafy. However, like any forage,

environmental conditions, maturity at the time of harvest, and production practices can greatly impact forage quality. In a hay preference trial conducted at Penn State, horses unaccustomed to teff preferred both mature alfalfa and timothy hay over teff hay. However, many agree that once acclimated to teff, most horses will readily consume teff.

A Kentucky study investigated the intake of teff hay cut at three different stages of maturity (boot, early, and late). Based on voluntary intake, horses preferred boot (1.8% bodyweight) and early-maturity (1.7% bodyweight) teff hays over late-maturity hay (1.5% bodyweight). Similar to what is observed in grazing research and with other forages, maturity can be a major factor in palatability and intake. In the Kentucky study, nutrient requirements for mature horses eating the less mature teff hays were generally met, although when consuming the late-maturity teff, DE and CP requirements were not met for adult horses at maintenance.

Collectively, research on grazing teff and feeding it as hay confirmed it can be used as a horse forage, but is more suitable for horses with lower energy demands or horses prone to metabolic concerns. While teff's niche in the horse industry is most likely as a forage for "easy-keeping," over-weight, laminitic, or metabolically challenged horses, there are some drawbacks and frustrations horse owners have anecdotally shared.

Due to the higher fiber values and lower NSC, some horses simply refuse to eat the forage. This is not surprising as past research has shown preference and intake are positively linked to NSC amounts and negatively linked to fiber values. In these cases, owners should provide part of the diet in teff, while including other more palatable forages.

Like any newer forage, there is also a learning curve in planting, harvesting, and feeding the forage. A few challenges shared by hay farmers include successfully planting the small-seeded forage, timely harvests, ideal cutting frequency of the mostly prostrate growing forage, and lack of labeled herbicide options. Finally, research is needed to establish if horses can be successfully maintained long term on only teff forage, and a vitamin and mineral supplement.