

Teff for Forage Production

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Introduction

Teff, *Eragrostis tef*, is an annual grass that has been gaining popularity for forage production. This warm-season grass originated in Ethiopia and has gained acceptance in many parts of the world for both its grain and forage qualities, with forage use receiving attention in the United States. Baling, ensiling, and grazing are potential options for this forage. Hay typically has good palatability, which is likely due to its fine stem structure and soft leaf tissue. Production yields and nutritional values are similar to cool-season grasses. It is often compared to timothy for quality. In contrast, as a warm-season grass, teff can help alleviate the impacts of summer slump. While cool-season grass production declines in the heat of summer, warm-season grasses can produce more dry matter with less moisture.

Cattle, sheep, goats, and horses will all readily consume teff hay and demand has been increasing among horse owners. Teff typically contains lower levels of NSC (nonstructural carbohydrates). This characteristic can be helpful for horses with certain metabolic conditions or lower energy needs.

Teff is a useful option as an additional forage source that can be planted after removal of a cereal grain crop such as wheat or barley. Teff can also be used to bridge over forage production when cycling a field out of alfalfa production. A first cutting of the alfalfa can be taken in the spring followed by termination of the alfalfa and planting of teff which can provide two to three additional cuttings of forage prior to cycling the field back to alfalfa the next spring.

Planting

Unlike cool-season grasses, teff cannot tolerate frost or cool soil conditions. Planting should occur after the potential for frost has passed and soil temperatures have



reached 65° F. In Ohio, late-May to mid-June would usually be optimal. The seed bed needs to be very firm at planting. Brillion seeders or packing after planting may help with seed to soil contact and improve emergence.

Teff seed is significantly smaller than most forages, consisting of approximately 1.25 million seed per pound. Due to the small seed size, coated seed may be easier to plant through many seed boxes. Seeding rates of four to six pounds per acre are recommended. If seeds are coated, the seeding rate should be increased to eight to ten pounds per acre. Calibration of the drill is very important due to the tiny size of the seed. Seeding too heavily will cause the teff to compete with itself in the stand and lead to poor tillering. Seeding depth should be 1/8 inch to 1/4 inch. Deeper planting may result in poor emergence rates. In good conditions, emergence typically occurs in three to five days. Teff is typically grown as a monoculture partially due to maturity timing with other grasses. Some research on interseeding into tall fescue to



reduce toxicity during late dry periods has been conducted with variable results.

Fertilizing

Soil test and apply phosphate and potash per recommendations. The adequate soil pH for teff grass is 6.0 to 6.5. Nitrogen fertilizer should be applied at planting at an estimated rate of 50 pounds of nitrogen per acre. Additional applications of 30 to 50 pounds of nitrogen per acre between cuttings can increase yields. Excessive nitrogen applications of over 100 pounds per acre may result in lodging leading to difficulty with harvesting.

Harvesting

Dry hay production works well for teff although baleage and silage are other options. Observations in Ohio indicate that it may take longer to dry to a safe moisture than cool season grasses. Initial cutting can be expected around 45 to 55 days after planting, when the plants are at a vegetative to early-boot stage. Waiting longer will result in a reduction in quality. If multiple cuttings are desired, it is important to use a cutting height of no less than three to four inches. The reserves necessary for regrowth are in the lower portion of the stems. Additional cuttings can be taken at 30 to 45-day intervals, when the plants are at the vegetative to early-boot stage.

Yields vary with weather, fertility, and planting date. Yields of two to four tons per acre have been common in this part of the country. Yields of over five tons can be obtained under good conditions.

Grazing

Teff has a delicate root system and can be easily uprooted during grazing. The forage manager can perform a tug test prior to harvest to test root strength. Take a handful of forage and gently tug upward to mimic grazing behavior. If the plants are uprooted, soils may be too wet for traffic or more time may be needed for root development. Grazing may be most successful as a replacement for last cutting hay.

Nutritional Value

The nutritional value of teff is very similar to timothy. When fertilized and harvested in a timely manner, crude protein (CP) will usually fall between 12% and 16%. Neutral detergent fiber (NDF) expectations are around 60% and total digestible nutrients (TDN) expectations are around 60% to 65%. Reported levels of non-structural carbohydrates (NSC) fall around 5.4% at the boot stage to 8.4% at a late cutting stage.

These carbohydrate values fall well below the suggested 10% upper level of NSC recommended for horses and are suitable for other classes of livestock as well. Since these values can vary with weather conditions, forage testing is important prior to developing a feeding program.

Teff does not have prussic acid toxicity issues that are sometimes experienced with annual forages such as sorghum and sorghum-sudangrass hybrids. It also does not have problems associated with ergot alkaloids or endophytic fungi. Like other grasses, there is a potential high nitrate levels after excessive nitrogen fertilization and drought conditions. Record all fertilizer applications in case weather and nitrate levels become a concern.



Ohio Trials

Forage trials involving teff have been conducted in Ohio throughout the years and a few are summarized in this fact sheet. Results indicate that when planted in mid-summer after wheat, teff can produce forage with yields and quality that is comparable to many other annual forages. When planted and managed for multiple cuttings in Ohio, teff can achieve results similar to other grass hay crops.



Clark County Trial 2009

Four varieties of teff were tested in Clark County. Seeding was conducted on June 16, 2009. Plots were fertilized with 200 pounds per acre of 46-0-0 which was incorporated and an additional 100 pounds per acre was applied after the first harvest. A broadleaf weed control herbicide was applied on July 17, 2009. Three cuttings were made with results listed in Table 1.

Morrow County Trial 2020

Teff, oats, sorghum-sudangrass, and annual ryegrass were planted in plots within a 20-acre field in Morrow County, Ohio in 2020. Planting for all plots occurred on July 31, 2020. Harvest occurred on October 3, 2020. All plots received 31 pounds per acre of nitrogen, 42 pounds per acre of phosphorus, and 37 pounds per acre of potassium. All sections were planted with a no-till drill and only one cutting was taken. Bales were wet wrapped and forage analysis was conducted on multiple bales from each trial. Results are displayed in Table 2.

Sandusky County Trial 2019

Seven types of annual forages were planted on two different dates, July 2, 2019, or July 29, 2019. These forages were harvested at either 63 days or 84 to 91 days after planting. The teff variety used was Summer Delight at a seeding rate of eight pounds per acre. Nitrogen fertilizer was added at 50 pounds per acre. Forage analysis was conducted for each planting and harvest date. Yield and forage quality are represented in Figures 1 and 2 below.

Table 1. Clark County Performance Trials 2009

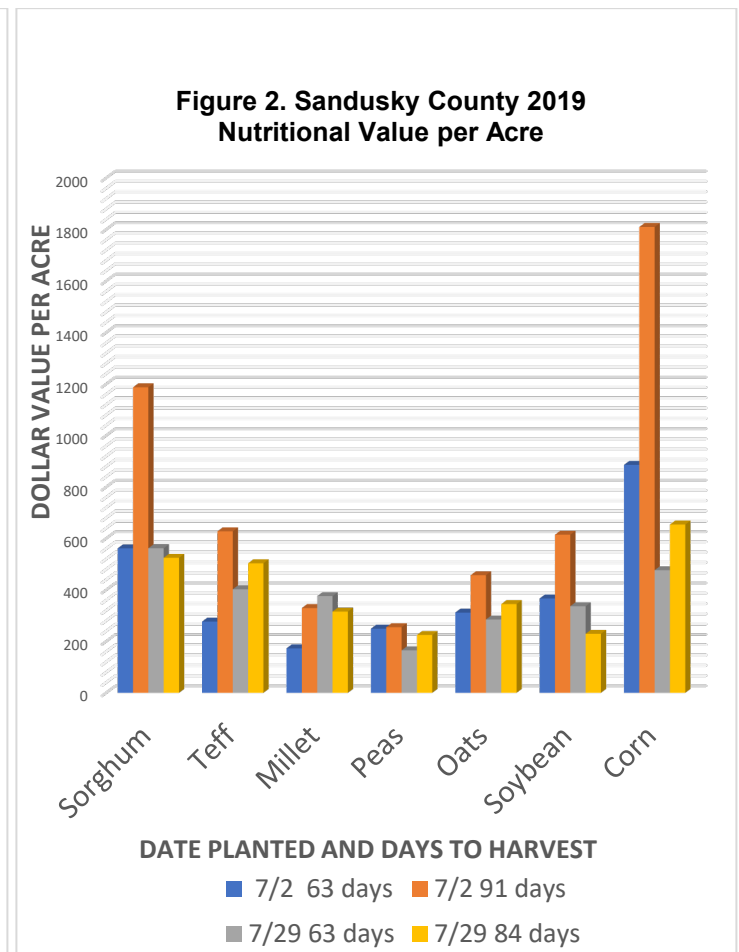
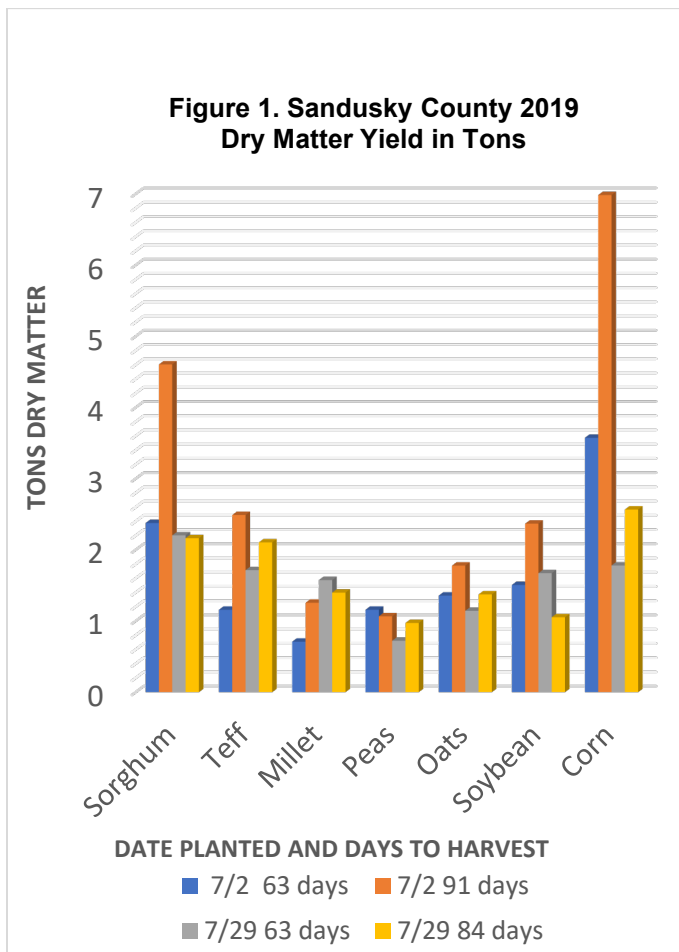
Variety	Marketer	3-Aug	2-Sep	5-Oct	Total
		----- Tons Dry Matter/Acre -----			
CW 0604*	Cal West Seeds	1.60	1.41	1.39	4.41 ⁺
CW 0801*	Cal West Seeds	1.29	1.33	1.46	4.10
Tiffany	Gries Seed Farm	1.41	1.27	1.39	4.06
VA-T1-Brown	Hankins Seed	1.48	1.26	1.28	4.01

*Statistically higher yielding than all other varieties

** NOTE** This trial data is from 2009

Table 2. Morrow County Trial 2020

Crop	Lbs. Dry Matter Per Acre	% CP	% NDF	% TDN
Teff Grass (Summer Delight)	2497	10.77	64.18	61.17
Oats	1082	17.07	47.26	65.78
Sorghum-Sudangrass	2741	10.60	52.67	65.52
Annual Ryegrass	1179	14.21	43.67	70.08



References

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