



# Teff Hay Production Guidelines for Utah

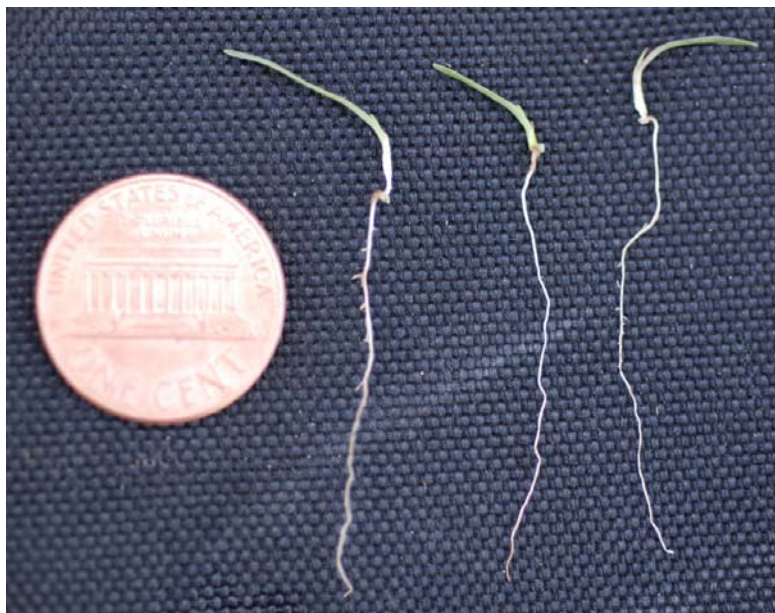
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Teff (sometimes spelled tef) [*Eragrostis tef* (Zucc.) Trotter] is a relatively new forage crop to Utah that has grown in popularity in recent years. It is an annual, warm-season grass that is native to Ethiopia. Teff has fine stems, shallow roots and is not frost tolerant. It can be harvested multiple times during a growing season and produces high yields of good quality, palatable hay at a relatively low cost.

## Why Teff?

Teff has several features that make it an attractive option for Utah's cropping systems.

*The time at which it grows.* As a warm season grass, teff grows best during the hottest months of the year (July and August). The traditional forage grasses in Utah are mostly cool-season grasses that tend to grow best during the fall and spring but slow in production during the summer months. This is often called the "summer slump." Since it occupies a different niche in the growing season, teff would not compete directly with cool-season grasses for acreage but can complement them nicely with high yields during the traditionally slow months. Despite its sensitivity to frost, teff is not known to have issues with prussic acid accumulation like sorghum.



**Figure 1. Teff seedlings at emergence. The crop grows somewhat slowly for the first 2 to 3 weeks as it develops a root system that will support rapid growth later.**



**Figure 2. A young stand of teff in a USU field trial in Kaysville, UT (2010).**

***Relatively short growing season.*** The first harvest for teff will normally occur within 45 to 55 days after planting, depending on location and year, and the second cutting 40 to 50 days thereafter. Coupled with its summer growth habit, teff can fill the role as an “emergency” forage crop in the event of delayed planting, poor stand, or winter kill of another crop. Teff also opens the door to the potential for “double cropping.” When an alfalfa stand begins to decline, some Utah growers will take a first cutting of alfalfa, remove the alfalfa stand, and then rotate to teff for an additional two cuttings. Others plant a small grain in the fall, harvest it for hay in the spring, and then plant teff in June.

***Low inputs and high yields.*** As described below, inputs of seed, fertilizer, and pest control are very low for teff compared to other warm season grasses like corn and sorghum. Furthermore, due to the short growing season, teff uses less irrigation water than many other crops.

### **Site Selection**

Like most crops, teff grows best on good, well-drained soils. It does, however, have the ability to grow on difficult sites (poorly drained soils, high pH, or high levels of salt) where other crops may struggle. Although teff is drought tolerant, it needs irrigation for high yields. It is not economical to

produce teff hay in a dryland setting in Utah. Also, avoid fields that are heavily infested with grass weeds.

### **Planting**

Like most warm season plants, teff grows poorly in cold temperatures and dies when exposed to freezing temperatures. The general recommendation is to plant teff after the last spring frost and when the soil temperatures at the 4-inch depth are at least 60°F. USU research has shown that planting in early- to mid-June is optimal for two teff cuttings, while a mid-July planting date is required for a grower targeting a single cutting.

Teff is extremely small seeded (approximately 1.25 million seeds/lb) so it requires a fine, firm seedbed, just like alfalfa. The seedbed must be free from emerged weeds at planting. Also, if teff is following a small grain (such as wheat, barley, oats, or triticale) harvested for forage, the stubble should either be sprayed with glyphosate (Roundup<sup>®</sup>) or tilled to prevent regrowth that will severely reduce teff yield and quality.

Teff is seeded at 5 pounds per acre, but higher seeding rates should be used when planting into a poor seedbed. Teff can be planted using the small seed box on a grain drill or broadcast using a Brillion or an air type seeder.



**Figure 3. Teff has an open panicle type seedhead. For optimal quality, teff should be harvested as soon as seedheads begin to emerge.**

Seeds should be planted shallow (less than  $\frac{1}{4}$  inch deep). Seed that is broadcast can be incorporated with a cultipacker or harrow, although often the small amount of soil movement that occurs during the first irrigation will be sufficient to cover the seed. Both coated and raw seed are available. Some growers prefer the coated seed because it is larger and easier to plant, but coated seed must be planted at higher rates to account for the weight of the coating material.

### **Irrigation**

The shallow placement and small size of teff seed necessitates light, frequent irrigations for establishment. With soil temperatures greater than 60°F, emergence will usually occur within 3 to 5 days. After emergence, teff is irrigated similar to any other grass crop. Teff is drought tolerant, but highest yields and quality are achieved with plenty of water. The amount of water required per cutting depends on irrigation method and location, but Utah farmers report an average usage of 6 to 12 inches.

### **Soil Fertility**

Research at USU and other universities has shown 50 to 60 units of nitrogen (N) should be applied to

teff both at planting and after the first cutting. Although higher rates of N can increase yield and quality, they can also increase lodging and are usually not economical. Very little is known about other nutrient requirements for teff. Until those recommendations exist, base phosphorous (P), potassium (K), and other nutrients on soil test levels for other forage grasses (i.e., small grains, pasture, etc.).

### **Pest Management**

Weeds are the major pest of teff in Utah. Teff grows slowly for the first 2 to 3 weeks, then rapidly thereafter. The weeds that are the greatest threat are those that emerge early and establish while the teff is small. The only herbicide that mentions teff forage specifically on its label is Latigo<sup>®</sup> (2,4-D + dicamba) (evaluation of labels during fall 2012). This product is applied postemergence and is very effective for control of emerged broadleaf weeds. As with any chemical, always read and follow label directions. For grass weeds, there are no herbicides available so fields with a history of grass problems should not be used for teff production. Problems with insects, plant diseases, and other pests in teff are rarely an issue in Utah.

**Table 1. Teff forage yield and protein response to nitrogen (N) rate at Kaysville, UT in 2010. The N rate below was applied both at planting and after the first harvest.**

N rate	Harvest 1	Harvest 2	Total	Protein
	-----Yield (tons DM/A)-----			%
0 lb N/acre	1.1	1.6	2.7	7.9
25 lb N/acre	1.7	2.2	3.9	10.2
50 lb N/acre	2.0	2.8	4.8	11.7
100 lb N/acre	2.5	2.9	5.4	16.5
<b>Average</b>	<b>1.8</b>	<b>2.4</b>	<b>4.2</b>	<b>11.6</b>

## Harvest

For optimal quality, teff should be harvested as soon as seedheads begin to emerge. In two-cut teff, this will normally correspond to mid- to late-July for the first harvest (50-60 days after planting) and early- to mid-September for the second (40-50 days after first cutting). At harvest, teff will normally be 2 to 3 feet in height. It is recommended that teff be cut with a 3 to 4 inch stubble height; any shorter will reduce the rate of regrowth and may kill some plants. Lodging can be an issue with teff, although problems can be minimized through proper harvest timing, lower N application rates, and limiting irrigation near harvest. Teff is not known to have nitrate toxicity or prussic acid accumulation issues like some other crops.

## Yield and Quality

Teff yield and quality can vary greatly based on management practices (Table 1). With good production practices, teff in Utah should yield 4 to 5 tons per acre with 10 to 14 percent protein.

## Uses

Historically, teff hay has primarily been produced for the horse hay market. Some Utah growers are beginning to explore its potential as a cattle feed. USU completed a feeding study during spring 2012 that found beef steers and dairy heifers to have similar weight gains on teff as they do on an alfalfa based diet.

## References

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This publication is issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Noelle E. Cockett, Vice President for Extension and Agriculture, Utah State University.