

# TEFF GRASS: A NEW ALTERNATIVE

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## ABSTRACT

Teff is fast becoming a new warm season annual grass alternative for forage producers across the U.S. Originating in Africa, its introduction into the U.S. initially was as an alternative grain source and also as a gluten free flour source for segments of the population suffering from Celiac's Disease (Gluten Intolerance).

The recent popularity of Teff however is not as a grain, but as an alternative Summer Forage Grass. The main advantages of new forage type Teff's are their ability to produce high yields combined with high quality in the summer months in contrast to cool season perennial grasses that lack adequate forage production during the "summer slump period".

**Key Words: Teff, Tef hay quality, Annual grass, Horse hay, Summer Forage, Forage grasses, Tiffany Teff, Dessie Teff, Corvallis Teff, Velvet Teff**

## INTRODUCTION

Teff (*Eragrostis tef*) a warm season annual grass (C4) is gaining popularity with farmers across the U.S. as a new alternative summer forage grass. Historically a cereal grain in Africa, Teff's previous role as a forage has been relatively limited. For centuries teff was a food crop in Africa and most recently as a niche crop in the U.S. as a gluten free flour source for individuals suffering from Celiac's Disease (gluten intolerance). Recent reexamination of the species by public and private researchers as a forage alternative has redefined the crop as a high yielding and high quality summer forage grass.

Early attempts at identifying and marketing forage teff varieties began with the researchers looking at the established grain varieties. However forage yields from the grain cultivars were somewhat limited due to their history of being selected primarily for grain production. The cultivars tended to mature early and as a result forage quality and yield suffered. Selection efforts eventually evolved into looking at the world collection and developing later maturing types with higher forage potential.

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Early examples of forage teff varieties in the U.S. were Dessie Summer Love Grass (Carlson, Idaho), S.D. 100 (Boe et al. 1986), and Bridger (Eckhoff et al.1997). Newer forage types such as Corvallis, Velvet and most recently Tiffany Teff (Miller, D. R. 2007) are gaining popularity in the marketplace.

## TEFF AS A FORAGE CROP

The main advantage of Teff is its ability to produce high quality hay in a relatively short growing season. Teff can be planted in late spring and be cut multiple times during the summer, with yields averaging 4-7 tons/acre, depending on the length of the growing season. Teff’s high yield during the summer months is an advantage over cool season grasses such as Timothy, which normally have poor production following the spring harvest (Table1). **Other summer grass may also have high yields, but what sets Teff apart is its high yield coupled with high quality.**

**TABLE 1: FORAGE QUALITY ANALYSIS, TEFF VS TIMOTHY**

Quality Analysis	Average	
	Timothy Hay	Teff Hay
% Crude Protein	8 – 14	9-14
Acid Detergent Fiber (ADF)	32 – 36	32 – 38
Neutral Detergent Fiber (NDF)	53 – 59	53 – 65
Total Digestible Nutrients (TDN)	57 – 65	55 - 64

## PLANTING & GROWING REQUIREMENTS

Teff is a warm season annual grass that requires a frost free growing season. The major threat to growing Teff is frost. Soil temperatures at planting should be at least 65° F. **Seed must be planted in the spring after the risk of frost has passed. A very firm seed bed is required at planting, with seed placement not to exceed 1/4 inch in depth.**

Teff is a very small seeded annual grass with an average of 1.3 million seeds per pound. Planting rate is 4-5 lbs per acre raw, and 7-10 lbs/acre for coated seed. Coated seed in most cases is preferred by growers since the small raw seed is often difficult to plant with conventional seeding equipment. Due to its small seed size teff plantings requires a firm seed bed, similar to alfalfa, in which good seed to soil contact is promoted. Planting depth should be 1/8 “to 1/4” deep. **Poor emergence will result if teff is planted in soft loose soil, or at a depth greater than ¼ inch.** Broadcast planting using a Brillion grass seeder and cultipacker combination, or a

spinner type grass seeder is often used. Brillion planters however, are considered optimal. Brillion seed planter settings can be found for most models on the following web site <http://www.targetseed.com>. If row planters are used, row-spacing should be very narrow to allow for stronger weed competition. Teff has an initial slow growth until a good root system has been established. Therefore weed control during stand establishment using herbicides or **management practices**, is recommended. If a broadleaf herbicide is applied, plant growth stage should be at least 5-7 leaves. As a new crop, herbicide programs are limited, and herbicides are currently being evaluated by researchers and Chemical suppliers. Growers should check with their local suppliers and adhere to approved labels restrictions until more information is available.

Adequate soil moisture or overhead irrigation is ideal for the crops fast germination, which occurs within one week under warm conditions.

The total seasonal nitrogen needs of Teff are relatively low, 50-70 lbs of available *N* . Small split applications of *N* (30 lbs) following each cut will enhance yields of later cuts. Moderate amounts of Phosphorous and in some cases sulfur may be required. Excessive fertilization should be avoided to prevent lodging. Harvest cuts should be made prior to seed head appearance for optimal forage quality, and to insure adequate plant reserves for regrowth in subsequent cuts. Cutting interval is generally 40-50 days for first cut and approximately 30 days for subsequent cuts, however this may vary by location. Rotary cutters are preferred with a stubble cutting height of 3-4 inches. Plant food reserves that fuel regrowth are stored in the bottom 4 inches of the plant stem, therefore cutting heights lower than 3-4 inches will severely reduce subsequent forage production.

## **DISEASE & PEST RESISTANT CROP**

Teff is a relatively new forage crop in the U.S., where disease and pest problems have seldom been observed in the crop. Teff is relatively free of most disease problems especially when compared to other grain crops used for hay. Preliminary University and grower trials have demonstrated that Teff can be grown, in most locations, without insecticides or fungicides. It is for the most part, considered a low input crop.

## **NUTRITIVE VALUE**

Nutritive value of Teff is comparable to Timothy, making it excellent forage for horses and other livestock (see table 1). Palatability and animal acceptance has been reported to be very good by horse owners.

Protein content of Teff hay ranges from 12-17% depending on the growth stage or maturity. RFV values have been reported in the range of 80-120. Oregon State University trials reported ADF and NDF values at 3 locations ranging from 32-40 and 53-70 respectively.

Teff hay is high in calcium as well as phosphorus, iron, copper, aluminum, barium, and thiamine. Potassium levels have been reported in some hays in the 2.5-3.0% range. Nitrate and Nitrite content is low under normal fertility conditions.

As with most forage crops, quality and digestibility decreases with maturity and fiber content increases. For optimal Nutritional value, a crop cutting interval avoiding seed head formation is recommended.

### **POSSIBLE USES**

- Excellent Horse Hay
- High Quality Forage hay similar to Timothy
- Ideal for Alfalfa rotations
- Excellent second crop for rotations
- Green Manure Crop
- Cover Crop for erosion control
- Extend Forage production of thin alfalfa stands for one season, by interseeding Teff (Interseeding should occur immediately after the first spring cut alfalfa when soil temperatures are higher 65° F.)

### **SUMMARY**

- Teff is a warm season annual grass that requires a frost free growing season (soil temp at planting should be a minimum 65° F). Premature planting in cool soils may result in season long stunting or yield loss. Soil depth should **not exceed ¼ inch. Firm seed bed is absolutely critical for proper stand establishment.**
- Teff is a great interim hay crop between alfalfa rotations.
- Profitable rotation crop for Alfalfa Growers for the premium horse hay market.
- Suitable for double cropping
- Good hay or pasture crop when late season plantings are required due to a crop failure.
- Low input annual forage grass.
- Very few disease and pest problems have been observed.
- Studies indicate that Teff can be grown in most locations, without insecticides or fungicides.
- Palatability and animal acceptance has been reported to be very good by horse owners.
- High Quality hay for horse owners with excellent animal acceptance.

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