



Teff as Emergency Forage

Introduction

Teff, *Eragrostis tef* (Zucc.) Trotter, is a warm season annual grass native to Ethiopia (Figure 1). It is adapted to environments ranging from drought-stressed to waterlogged soil conditions. The seeds are extremely tiny, containing about 1.25 million seeds per pound. Despite its small seed size, teff is an aggressive competitor once established. In its native habitat maximum production occurs with a growing season rainfall of 17 to 22 inches and a temperature range of 50 to 85°F.

In Ethiopia, Teff is predominantly grown as a cereal crop and not as a forage crop. Teff flour is primarily used to make a fermented, sourdough type, flat bread called *Injera*. Teff is also eaten as porridge or used as an ingredient of home-brewed alcoholic drinks. It is high in iron content and contains very little gluten. In addition, the teff plant is used as a livestock forage or pasture crop. It is primarily grown in Africa, India, Australia and South America. In the United States, teff is grown on limited acres in the Pacific Northwest and Midwest.



Figure 1: Teff is a warm season annual grass with great promise as an emergency forage crop in New York.

Recent research from the Oregon State University Klamath Experiment Station and the Cornell Cooperative Extension Associations of Jefferson, St. Lawrence and Rensselaer

Counties indicate great promise for teff as a forage crop. Potential uses for teff in New York include:

- Emergency hay, pasture or silage crop that can be planted in mid-summer.
- Summer annual cover crop for erosion control.
- Green manure crop.
- Stand alone annual hay crop for market.
- Rotation break crop when renovating a perennial grass or alfalfa stand or pasture.

The crop can reduce forage production losses due to “summer slump” when used as an annual pasture. It could follow winter cereal forage, straw or grain crop or spring cereal forage crop in the rotation and an additional advantage is that teff can be grown with conventional forage seeding and harvesting equipment.

Planting Date

Teff can not tolerate frost and does not establish well in cool soils. While we have not conducted any teff planting date trials in New York, teff planting should probably be delayed until June when soil and air temperatures are higher (Figure 2). Teff can be seeded from June through late July.



Figure 2: Teff does not tolerate frost or establish well in cold soils so delay planting until June when it is warmer.

Seeding Rate and Methods

The suggested seeding rate is 4 to 5 lbs/acre. A limited number of seeding rate studies from other universities showed that increasing the seeding rates beyond 4 to 5 lbs did not impact forage dry matter yields. Proper seed depth is critical; plant teff between $\frac{1}{8}$ and $\frac{1}{4}$ inch deep into a very firm seedbed. Planting deeper than $\frac{1}{2}$ inch is likely to result in a complete stand failure. Teff may be planted with a cultipacker seeder (i.e. Brillion seeder) or a conventional or no-till grain drill equipped with a small seed box attachment. The small seed size makes it very easy to plant too deep. If planted at the right depth, teff could emerge in 3 to 4 days.

Fertilizer

A soil test should be used to determine if P and K are adequate for the crop. If additions are needed, apply P and K similar to perennial grass establishment. One year of field data from four locations in New York showed an optimum N rate of 50 lbs N/acre broadcast at planting (Figure 3). At higher rates, lodging occurred, making harvest very difficult.

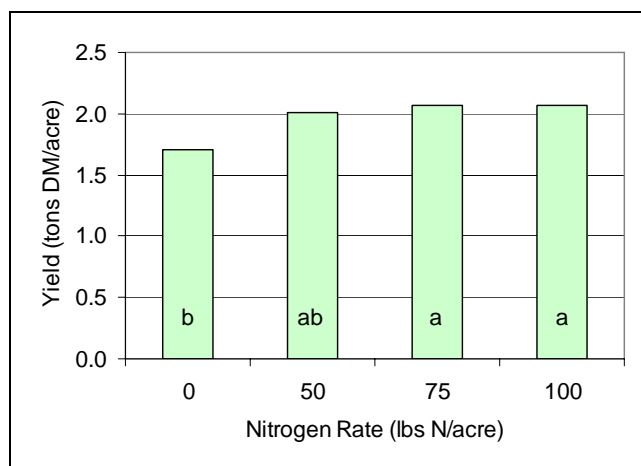


Figure 3: An application of 50 lbs N/acre at planting was sufficient for Teff grown as forage crop at 4 locations in New York State in 2006.

These data are consistent with recent teff N studies at Oregon State University, Montana State University and the University of Kentucky but additional site-years in New York are needed. Crude protein increased with N rates. All N studies were conducted under a single cut system. Under a multiple cut system, additional N might be needed.

Harvest Management

For optimum forage quality, teff should be harvested in the late vegetative stages (pre-

boot to early-boot stage). First harvest will occur approximately 50 to 55 days after planting and subsequent harvests should be expected in 40 to 45 days depending on moisture and temperature. In a multiple-cut system a 3 to 4 inch cutting height is necessary to promote vigorous regrowth; cutting lower than this will stunt the crop.

Teff can be harvested as a high moisture forage crop and ensiled, or baled as dry hay. Teff can also be used as pasture forage for livestock. Maintaining forage quality and obtaining adequate dry matter yields through the summer months remain a challenge for pasture-based dairy and livestock production. Perennial cool-season pasture grasses generally yield very well throughout the summer months if rainfall is near normal. Under hot and dry environmental conditions these pasture grasses lose quality and dry matter yields are reduced, especially in the latter half of the summer. Warm season summer annual grasses, such as teff, may offer a solution to this potential problem.

Forage Quality and Yield

When teff is harvested at the proper time and sufficient N was applied, crude protein will generally be between 15 and 16% of dry matter. Neutral detergent fiber (NDF) 48-hr digestibility averaged over 128 forage samples was 69.4% of NDF and the NDF was 60.7%. In each of the two years of New York field trials, teff produced 2 tons of forage dry matter with harvest approximately 50 days after planting. These results show that teff can rival average New York grass hay dry matter yields and produce relatively high quality forage with proper management.

For more information



Cornell University
Cooperative Extension

Jefferson, St Lawrence and Rensselaer Counties

To Download Agronomy Fact Sheets:
<http://nmisp.css.cornell.edu>

Mike Hunter, Pete Barney, Tom Kilcer, Jerry Cherney, Joe
Lawrence and Quirine Ketterings

2007