Tef (Eragrostis Tef) is a warm season annual grass native to Ethiopia. It grows as fine-stemmed clumps with many tillers. The clumps vary in height from 10 to 50 inches, depending on the variety. The numerous leaves are narrow, hairless, smooth and grow nearly as tall as the seed heads. The root system is fibrous and shallow, but massive. The seeds are tiny (1.25 million/pound) and grow in various shades of white, red, brown, or almost black, again depending on the variety. They are produced in heads that range from very open to compact. Figure 1 is a line drawing of a typical Tef plant.

Planting site descriptions and methods

The four planting sites were all planted using the same equipment. The seed was broadcast using a “Gandy” fertilizer box, which dropped the seed onto a spinning platform, resulting in a seeding swath approximately 12-feet wide. The seed was spread evenly on the plots. The plots were rolled with a cultipacker immediately following the seeding operation and irrigated following the cultipacking operation.

Figure 1. Typical Tef plant, showing leaf shape and seed head.

Nevada Cooperative Extension Fact Sheet-04-51 discusses Tef uses, adaptations and recommended agronomic practices in detail. It also provides information on the results of the 2003 Tef demonstration trial efforts. Fact Sheet-05-28 describes the results of the 2004 Tef trial.

Fallon Demonstration 2005

Following two years of increasingly successful Tef production, four local agricultural producers decided to plant Tef in 2005. A total of 84 acres of Tef was planted at four locations in the Lahontan Valley during May and June of 2005. The Tef seed planted in 2005 was the variety “Dessie” and was obtained from a seed dealer in Idaho.
The harvest procedure for each site included swathing with a conventional sickle bar swather that had the conditioner rollers removed (site 1) or opened to the maximum widths (sites 2, 3, 4). The swaths were allowed to dry for at least 10 days and then combined using an older model “Gleaner” combine. The seed was stored and transported in 35” X 35” X 60” duffle top, woven polypropylene bags to Caldwell, Idaho, where it was cleaned. Each bag held approximately 2000 pounds of seed. The average cleaning percentage was 80% and the seed was judged of sufficient quality to grind into flour. The straw remaining after the combining procedure was baled within a few days following the combining operation.

The soils on each site were mapped and classified by the Natural Resources Conservation Service (NRCS) for the Fallon-Fernley Area, Nevada Soil Survey. The NRCS separates soils into capability units related to crop production potentials. The capability classes range from Roman numeral I to VIII with I representing soils with no limitations and VIII representing soils where commercial crop production is unfeasible. In every instance, the soils require irrigation, which is a limitation that precludes any soil in the Lahontan valley from achieving a class I rating. In addition, the NRCS assigned phases to the soils indicating the degree that the soils may be affected by soluble salts or alkalinity. Soils deemed free of excess salts or alkali contain less than 4 deciSiemens/meter (ds/m) salts and less than 15% exchangeable sodium. Soils considered slightly saline exhibit soluble salt levels of 4-8 ds/m and exchangeable sodium levels of 15-20%. Strongly saline soils had soluble salt levels in excess of 15 ds/m and exchangeable sodium levels of more than 25%.

**Planting site # 1**

Site 1 was a 20-acre field located on soils consisting primarily of clays and clay loams that were slightly saline in nature. The soils had slow permeability rates and a water table depth of 3 to 5 feet. They are deep soils with crop production capabilities that range from class II to IV.

The Tef was seeded on June 1, 2005 at a rate of 1.75 pounds per acre. The field was fertilized with approximately 40 pounds per acre of actual nitrogen prior to planting the seed. No weed control was applied to this crop in 2005. It was irrigated five times with a total water application of approximately 2-acre feet per acre.

**Planting site # 2**

Site 2 was approximately 28 acres in size and had soils described as slightly saline loams. The permeability rate was described as slow, and a water table was located from 3-5 feet below the surface. These soils are deep and have a crop capability rating of II, meaning there are few limitations to crop production on this site.

The Tef was seeded on June 10, 2005 at a rate of 4.5 pounds per acre. No fertilizer was applied. Weed control consisting of 2.0 pounds per acre acid equivalent (ae) 2,4-D was applied after the plants had tillered. It was irrigated with approximately 3.25-acre feet of water per acre.

**Site # 3**

Site 3 was approximately 23 acres, with soils described as sands and loamy fine sands. The soils have a rapid permeability rate and a water table at approximately 3 feet. The soils crop capability classes on the field included classes II (27%), IV (17%) and VII (56%).

The field was seeded on June 5, 2005 at a rate of 2 pounds per acre. This site received two applications of nitrogen in irrigation water, for a total of 35 pounds of actual nitrogen per acre. Weed control consisted of the application of 2 pounds ae 2,4-D per acre applied after the plants had tillered. The Tef was irrigated five times for a total of approximately 3-acre feet per acre applied in 2005.

**Planting site # 4**

Site 4 was about 13 acres in size and included soils classified as clay and sandy loams. The soils have few limitations to crop production and were all class II. The water table is described as being 3 to 5 feet below the surface, with permeability being described as slow. The field was not fertilized in 2005. Weed control consisted of the application of 2.0 lbs ae per acre 2,4-D after the Tef had tillered. The field was irrigated four times for a total of approximately 2-acre feet of water per acre.
Results by planting site

Site # 1

Planting site # 1 was the most productive of the four locations planted in 2005. The seed harvest began on September 16, 2005. This site yielded slightly over 1500 pounds per acre of clean seed. The straw yields averaged 3.5 tons per acre. The seed was sold for $0.35 per pound and the straw was valued at $80.00 per ton, based on local sales that occurred by other Tef producers. All the seed was sold to a single consumer who normally contracts for Tef seed. However, none of the producers who grew seed in 2004 had signed a contract prior to growing the seed. The straw was used as forage by horse and goat producers. Table 1 displays the result obtained on each planting site in 2004.

Table 1: Tef Seed & Straw Yields 2004

<table>
<thead>
<tr>
<th>Site 1</th>
<th>Site 2</th>
<th>Site 3</th>
<th>Site 4</th>
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<tr>
<td>1.5</td>
<td>2.2</td>
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<td>2.5</td>
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Planting site #2

Site # 2 produced approximately 1000 pounds per acre of clean seed and 3.25 tons per acre of straw. Harvest of these fields occurred during the first week of October. The Tef seed was sold for $0.35 per pound and the straw was valued at $80.00 per ton.

Planting site #3

Site # 3 was harvested during the second week of October, 2005. It produced approximately 500 pounds per acre of clean seed and 1.5 tons per acre straw. The Tef seed and straw were sold for the same values listed previously in sites # 1 and 2.

Planting site # 4

Site #4 was harvested last and the harvest concluded during the third week of October. This site produced slightly over 320 pounds per acre of clean Tef seed and two tons per acre of straw. The seed sold for $0.30 per pound and the straw was valued at $50.00 per ton because it was preserved as big bales weighing approximately 1300 pounds. The big bales are not readily adapted for the horse or small animal market.

Observations of results.

Several observations were recorded following the 2005 production season. These observations were made by the Tef producers and author of this fact sheet and relate to production of Tef for seed. Future fact sheets will address forage production. The observations are intended to assist in any future production efforts related to Tef production.

1) In western Nevada, Tef should be planted by mid-May in a clean, weed free, field.
2) The seedbed should be firm and fine textured at planting.
3) The seed should be rolled with a cultipacker following seeding.
4) Seed production will suffer if Tef is planted too heavily, which is greater than 2 pounds per acre.
5) Tef is a poor competitor during the first 2-3 weeks, especially with summer annual, grassy weeds.
6) Irrigation is needed every 7-10 days until the Tef has tillered.
7) Broadleaf weed control with 2,4-D amine is successful when applied after the Tef has tillered.
8) Tef produced for seed will lodge badly, slowing the swathing operation.
9) Best yields are obtained when the Tef is cut and windrowed by a machine without conditioners.
10) Pick-up belts on a combine improve the harvest operation.
11) Baling the straw immediately following the combine operation improves the appearance and salability of the straw.
Resources used to prepare this fact sheet


