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Teff: A New Annual Forage Grass for South Dakota?

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Teff (*Eragrostis tef* Zucc. Trotter) is a major cereal crop in Ethiopia and has been grown in other African countries as a hay crop. Teff is a warm-season, annual grass that has rapid seed germination and seedling development. It also is well adapted to dry climates. These qualities indicate that teff could be used in this region of the U.S. as a supplemental forage during periods when other forage supplies are diminished. In South Dakota, late summer is when forage supplies are typically low.

Teff has been marketed recently in South Dakota under the name "Dessie Summer Lovegrass." This marketing campaign has created interest among producers in the crop's forage potential.

The following information summarizes research conducted at SDSU, over several years, on the forage potential of teff.

Forage Yield

A study at Brookings and Highmore in 1986 compared the yield performance of teff to three other warm season annual grasses. The grasses were cut at either an early stage (boot) or a late stage (early heading). If any regrowth was present, it was harvested in the fall.

Sudangrass consistently produced two to three times higher yields than the other species tested at both locations (Table 1). Teff and German foxtail millet generally produced similar yields, while Siberian foxtail millet was consistently the lowest-producing grass. This was because the Siberian foxtail millet did not produce any regrowth after the early or late cuttings as the other grasses did.

Growing conditions during 1986 were considered optimum at both locations; precipitation was above normal from April through September.

A similar study was conducted in 1988. Sudangrass produced yields four to six times higher than teff at both Brookings and Highmore (Table 2). Precipitation received at both locations was approximately 50 and 30% below normal during June and July, respectively.

The growth of teff appeared to be quite stunted and it was thought initially that the poor yield was caused by drought conditions. Further inspection revealed that teff was being infested by the larvae of a stem-boring wasp, *Eurytomocharis eragrostidis*. This insect infests cereal crops and many other grasses. The larvae were found in approximately 30% of the infested teff stems in late July at both locations.

This is the only instance, in more than 5 years of research at SDSU, that this insect has been a problem on teff grown in South Dakota. Still, the potentially devastating effects of this insect on teff make it a problem with which producers need to be concerned.

Table 1. Forage yield of four grasses grown at two locations under two harvest management systems in 1986.

	Brookings		Highmore	
Grass	Boot	Early heading	Boot	Early heading
	----------tons/acre---------			
Siberian millet[1]	1.3	3.7	3.0	4.6
German millet[2]	3.5	5.9	4.6	6.2
Sudangrass[3]	5.7	9.7	12.2	11.2
Teff[3]	4.7	5.3	4.3	4.6
LSD (0.05)		1.9		

[1]Yields from regrowth were not obtained for either harvest.
[2]Yields from regrowth were added to the early harvest only.
[3]Yields from regrowth were added to both early and late harvests.

Table 2. Forage yield of three grasses grown at two locations under two harvest management systems in 1988.

Grass	Brookings		Highmore	
	Heading	Soft dough	Heading	Soft dough
	----------tons/acre----------			
Siberian millet[1]	1.3	2.5	1.9	2.2
Sudangrass[2]	7.4	7.1	6.4	4.8
Teff[2]	1.3	1.2	1.0	1.2
LSD (0.05)		0.6		

[1]Yields from regrowth were added to the early harvest only.
[2]Yields from regrowth were added to both early and late harvests.

At the present time, it is impossible to predict when high populations of this insect will be present in South Dakota. This limits our ability to accurately predict long-range forage yields.

Date of Planting

A study was conducted at Beresford and Highmore in 1990 to investigate the effect of planting date on forage production of teff. The teff was planted in late May, late June, or mid July. Highest yields were obtained when teff was planted in late-May (Table 3).

Two treatments were planted in late May. In one, two cuttings were made; in the other, only one cutting was made. For the latter treatment, the teff was extremely mature at harvest and a large percentage of the plants were lodged. This type of management would not be recommended.

The optimum production program would be to plant the teff in late May, take a hay harvest in early August, and either harvest the regrowth for hay in mid September or graze it.

Forage Quality

Teff has forage quality characteristics similar to other annuals commonly grown for forage in South Dakota (Table 4). Teff did have a slightly higher crude protein content at Highmore compared to the other species, but differences at Brookings were not significant.

In terms of in vitro dry matter digestibility (IVDMD), which is a laboratory method for estimating digestibility, German millet had the highest IVDMD at both locations (Table 4). Differences among the other species were small at both locations.

There is no published research information available to date measuring animal performance on teff forage. That is vital information, and research needs to be conducted before any predictions can be made concerning animal weight gains, conception rates, etc., when teff is the primary feedstuff.

Other Agronomic Considerations

Teff is a small-seeded crop, with about the same number of seeds per pound as timothy.

When seeding teff, prepare the seedbed in much the same manner as for alfalfa — the firmer the better. Seed teff at a rate of 4 to 8 pounds of pure live seed per acre. An excellent implement to use when seeding teff is a cultipacker or “Brillion” seeder. This implement places the seed at a depth of about 1/2 inch, which is optimum for teff.

Teff seed germinates rapidly after planting. It reaches the heading stage in about 8 weeks.

Teff can be harvested for hay or grazed. Use caution when grazing because teff is a shallow-rooted crop and livestock may pull the plants out of the ground.

Teff is an annual crop. If it has been hayed or grazed before seed maturation, there should not be a problem with volunteer teff in a following field crop.

Summary

Results from several years of research at SDSU indicate that teff does have some potential as a forage crop in South Dakota. It is a grass that offers some flexibility, since it can be seeded from May through July.

Yields obtained from teff ranged from 1.3 to 5.3 tons/acre in these SDSU studies.

Table 3. Forage yield of teff grown under different management systems at Beresford and Highmore, S.D. in 1990.

Planting Date	No. Harvests	Maturity	Forage yield
			--tons/acre--
Late May	2	heading, mature seed	4.7
Late May	1	mature seed	5.0
Late June	1	early heading	1.3
Late June	1	75% mature seed	2.4
Mid July	1	early seed	2.0
LSD (0.05)			1.3

The finding that teff is susceptible to infestation by a stem-boring insect indicates that further research is needed to better understand this insect-plant relationship. The potentially devastating effects of this insect severely limit predictability of teff forage yields at this time.

Table 4. Crude protein and IVDMD of four grasses grown at two locations under two harvest management systems in 1986.

	Crude protein		IVDMD	
Grass	Brookings	Highmore	Brookings	Highmore
	----------x----------			
German millet	9.2	12.2	67.1	59.1
Siberian millet	8.9	12.6	58.7	53.2
Sudangrass	9.7	12.4	56.1	53.9
Teff	10.7	17.4	54.0	51.2
LSD (0.05)	1.8		4.6	

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