SOUTH DAKOTA - Forage Yield Potential of Annual Cool- and Warm-Season Crops

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Perennial forages provide most of the livestock feed in western South Dakota. However, frequent droughts in recent years have resulted in feed shortages, driving a high demand for alternative forage sources. Annual crops can be of great value in year-round forage systems. They provide early grazing before perennials are available, extend the grazing season, and increase hay and silage production. This study assessed the forage yield potential and adaption of warm- and cool-season annual crops for western South Dakota.

Ten entries each of cool- and warm-season crops were evaluated in replicated trials near Ralph, SD (northwestern). Species and varieties are listed in Tables 1 and 2. Entries were planted in 6-row plots, 5' x 30', at recommended seeding rates. The cool-season trial was planted early April; the warm-season trial in early June. Cool-season crops were harvested once at each of four dates shown in Table 1. Warm-season crops were harvested once at each of five dates starting August 4 and weekly thereafter.

Table 1. Forage yield (ton/ac) of cool-season crops at Ralph, SD in 2010.

Crop (Variety)	July 7	July 14	July 28	Aug 4	Average
Pea ('Arvika')	1.4	2.1	2.4	1.7	1.9
Pea ('Mozart')	1.5	2.1	1.9	1.2	1.6
Hairy Vetch	0.6	1.1	1.8	1.8	1.3
Oat ('Troy')	2.2	2.6	3.0	2.9	2.7
Oat/Pea (60% Troy/40% Arvika)	2.0	2.4	2.9	2.3	2.4
Barley ('Haybet')	1.9	2.3	2.5	2.0	2.5
Barley/Pea (40% Haybet/40% Arvika)	1.7	2.2	2.4	1.9	2.2
Spring Triticale (Common)	1.7	2.2	2.8	2.9	2.4
Spring Triticale/Pea (60% Trit/40% Arvika)	1.7	2.2	3.0	3.0	2.4
Spring Wheat ('Traverse')	1.4	1.6	2.2	2.3	1.8
Average	1.6	2.1	2.5	2.2	-
LSD *(0.05)*	0.2	0.3	0.4	0.4	-
CV	15.1	15.6	16.4	16.9	-

On average, forage yields of cool-season crops increased from 1.6 ton/ac on July 7 (heading for cereals, and flowering to early pod for legumes) to 2.5 ton/ac on July 28 (milk to soft dough for cereals, and late pod for legumes). Among entries, oats produced the greatest average and early-season yields. The two pea varieties performed similarly and had less forage yield than cereal crops. Hairy vetch had the least yield, as it grew slowly and barely covered the ground at first harvest.

Maturity among warm-season crops varied considerably at each harvest. For example, on August 4, foxtail millets were already at early grain-filling, pearl millet was at early heading, and sorghum-sudan hybrids were pre-heading. Average forage yield of warm-season crops increased from 1.6 ton/ac on August 4 to 2.9 ton/ac on September 1. Across entries, Manta and Golden German foxtail millet produced the greatest yields, and cowpea the least. Teff yielded less than other grass crops. Based on forage yield potential; among cool-season crops, oats or barley are recommended, whereas Manta or Golden German foxtail millet are recommended as warm-season options. Forage quality analyses will help refine these conclusions.

Table 2. Forage yield (ton/ac) of warm-season crops at Ralph, SD in 2010.

Crop (Variety)	Aug 4	Aug 11	Aug 18	Aug 25	Sept 1	Average
Teff Grass ('Tiffany')	1.2	2.1	2.3	2.6	2.0	2.0
Foxtail Millet ('Manta')	1.9	2.9	3.2	3.5	3.7	3.0
Foxtail Millet ('Golden German')	1.9	2.5	3.2	3.4	3.6	2.9
Foxtail Millet ('White Wonder')	1.7	2.4	2.6	3.2	3.3	2.6
Proso Millet ('Sunup')	1.9	2.5	3.0	3.3	3.4	2.8
Pearl Millet ('Pro Millet')	1.7	1.9	2.6	3.0	3.1	2.5
Sorghum-Sudan ('Honey Sweet')	1.6	2.5	2.9	3.3	3.5	2.8
Sorghum-Sudan ('Honey Sweet 2')	1.6	2.3	2.4	2.8	2.7	2.4
Sorghum-Sudan ('Honey Sweet BMR')	1.6	2.4	2.7	2.9	3.2	2.7
Cowpea ('Red Ripper')	0.8	1.0	0.8	0.9	0.7	0.8
Average	1.6	2.2	2.6	2.9	2.9	-
LSD *(0.05)*	0.2	0.3	0.4	0.5	0.6	-
CV	14.0	15.5	15.8	16.0	22.0	-