

HOW EMERGENCY FORAGE CROPS GREW IN 2003

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Perennial forage crops are the foundation of ruminant livestock feeding programs in the North Central USA. However, because of the harshness of the region's climate, perennial forage crops occasionally winterkill, leaving producers faced with an immediate loss in supply of high quality forage. In other years, excess spring moisture does not allow producers to seed perennial forages during the window of time that typically provides the greatest likelihood of establishment success. The producer is thus faced with a forage supply shortage and will often need to consider an annual forage crop to fill the gap.

In 2003, we conducted an emergency forage trial at 5 locations across Wisconsin and Minnesota: Arlington, Marshfield, and Spooner, WI; and St. Paul and Pelican Rapids, MN. Crop species seeded are listed in Tables 1-3. Replicated plots were seeded at all locations at each of three planting dates: early May, early June, and ~July 1. Corn was planted at 32,000 seeds/acre in four 3" rows. Forage sorghum was also planted in four 3" rows, but at 10 lb/ac. All other entries were seeded in ten 6" rows. Planting rates for other entries were 25 lb/ac for sudangrass, sorghum-sudan, pearl millet, Japanese millet, and foxtail millets; 80 lb/ac for barley, 100 lb/ac for soybean, 125 lb/ac for small grain/pea, and 15 lb/ac for alfalfa.

Soil potash and phosphorus levels were high at all locations. Nitrogen fertilizer was applied to selected entries at all locations except Pelican Rapids, where 6000 gallons/ac manure were applied the fall prior to planting. Barley and foxtail millets received 100 lb N/ac at planting. Corn and forage sorghum received 150 lb N/ac at planting. The multi-cut warm-season annual grasses (sudan, sorghum-sudan, Japanese millet, and pearl millet) received 50 lb N/ac at planting, and 50 lb/ac after each additional cutting (up to a maximum of 150 lb N/ac/yr). Cutting height for the latter species was 6" to encourage regrowth in a multi-cut harvest system. In general, harvest timing was scheduled to optimize yield and quality. Barley and foxtail millets were harvested at the boot stage, small/grain pea at milk stage, and soybean at R6-7. Corn was harvested at ½ milk or 65% moisture, whichever came first. Forage sorghum was harvested at soft dough or 65% moisture. Alfalfa was harvested at 60 days after emergence, and 30 day intervals thereafter. Sudangrass, sorghum-sudan, pearl millet, and Japanese millet were harvested whenever sudangrass reached a height of 36". These harvest strategies resulted in one to three harvests per entry depending upon planting date.

Yield data are presented in Tables 1-3. It is important to note that 2003 was a very dry year at all locations. Preliminary forage quality data from a trial conducted in Minnesota in 2002 (a very wet year) are presented in Table 4.

Table 1. Total season forage DM yield of emergency forages planted in EARLY MAY at 5 locations across Wisconsin and Minnesota.

Species	Entry	Wisconsin			Minnesota		AVG.	
		ARL ¹	MAR	SPO	STP	PEL		
		----- DM Yield (ton/ac) -----						
Corn	80-85d (1877)	6.10	3.90	6.51	na	5.90	5.60	
Corn	90-95d (2395)	8.11	3.82	7.10	na	6.75	6.45	
Corn	100-105d (2587)	9.01	3.37	6.82	na	4.85	6.01	
Forage Sorghum	Dairy Master BMR	12.81	1.23	4.50	5.36	4.38	5.65	
Sudangrass	Greenleaf	4.32	1.04	4.26	3.70	4.76	3.62	
Sorg-Sudan	Greantreat IV	Na	1.21	3.44	2.54	4.34	2.88	
Sorg-Sudan	Drip-O-Honey BMR	6.65	1.22	3.10	3.57	4.62	3.83	
Pearl Millet	PP102M Hybrid	0	0	3.79	1.22	3.48	1.70	
Japanese Millet		3.72	1.06	3.99	2.73	2.34	2.77	
Foxtail Millet	Manta Siberian	2.44	1.82	1.81	3.42	2.93	2.48	
Foxtail Millet	German	1.96	1.82	2.62	3.02	5.21	2.93	
Soybean	B076RR (RM0.7)	2.18	1.27	2.60	3.40	2.87	2.46	
Soybean	X53252RR (RM2.5)	2.78	1.20	2.84	4.05	2.90	2.75	
Barley	Westford	3.60	1.63	0.79	2.41	3.06	2.30	
Barley/Pea	Robust/Trapper	3.56	1.86	0.31	2.93	3.40	2.41	
Oat/Pea	Jerry/Trapper	3.13	1.60	0.61	3.37	3.09	2.36	
Alfalfa	WL 319HQ	2.40	1.04	na	3.45	1.04	1.98	
LSD (0.05)		0.78	0.78	0.78	0.88	0.89		

¹ ARL = Arlington, MAR = Marshfield, SPO = Spooner (irrigated), STP = St. Paul, and PEL = Pelican Rapids (Otter Tail Co.).

Table 2. Total season forage DM yield of emergency forages planted in EARLY JUNE at 5 locations across Wisconsin and Minnesota.

Species	Entry	Wisconsin			Minnesota		AVG.
		ARL ¹	MAR	SPO	STP	PEL	
		----- DM Yield (ton/ac) -----					
Corn	80-85d (1877)	6.80	4.57	5.09	5.02	5.23	5.34
Corn	90-95d (2395)	8.36	4.70	6.51	5.57	5.43	6.11
Corn	100-105d (2587)	8.76	4.74	5.69	4.93	4.32	5.69
Forage Sorghum	Dairy Master BMR	15.49	4.49	7.27	5.36	4.41	7.40
Sudangrass	Greenleaf	4.39	2.77	4.06	3.79	3.71	3.74
Sorg-Sudan	Greantreat IV	na	2.41	2.80	3.41	3.15	2.94
Sorg-Sudan	Drip-O-Honey BMR	5.46	2.89	3.02	3.51	2.81	3.54
Pearl Millet	PP102M Hybrid	4.78	2.81	3.43	3.59	2.80	3.48
Japanese Millet		2.63	1.85	3.68	3.00	0.58	2.35
Foxtail Millet	Manta Siberian	3.40	2.38	2.70	4.55	1.73	2.95
Foxtail Millet	German	2.96	2.36	3.55	4.85	3.43	3.43
Soybean	B076RR (RM0.7)	2.54	2.31	2.95	3.70	2.05	2.71
Soybean	X53252RR (RM2.5)	3.07	2.47	2.77	3.75	2.29	2.87
Barley	Westford	1.88	2.67	1.36	2.02	1.30	1.85
Barley/Pea	Robust/Trapper	2.70	2.44	0.91	2.16	1.74	1.99
Oat/Pea	Jerry/Trapper	2.25	2.62	0.71	2.48	1.14	1.84
Alfalfa	WL 319HQ	1.22	0.87	na	1.26	0.35	0.93
LSD (0.05)		0.78	0.78	0.78	0.88	0.89	

¹ ARL = Arlington, MAR = Marshfield, SPO = Spooner (irrigated), STP = St. Paul, and PEL = Pelican Rapids (Otter Tail Co.).

Table 3. Total season forage DM yield of emergency forages planted on 1 JULY at 5 locations across Wisconsin and Minnesota.

Species	Entry	Wisconsin			Minnesota		AVG.	
		ARL ¹	MAR	SPO	STP	PEL		
		----- DM Yield (ton/ac) -----						
Corn	80-85d (1877)	7.62	2.66	4.60	4.62	2.51	4.40	
Corn	90-95d (2395)	8.67	2.48	5.38	4.18	2.50	4.64	
Corn	100-105d (2587)	9.05	2.80	4.75	4.61	2.76	4.79	
Forage Sorghum	Dairy Master BMR	9.41	3.20	3.87	4.65	3.41	4.91	
Sudangrass	Greenleaf	3.10	2.21	2.84	3.86	2.97	3.00	
Sorg-Sudan	Greentreat IV	na	2.28	2.89	3.60	2.89	2.91	
Sorg-Sudan	Drip-O-Honey BMR	4.56	2.24	2.90	3.10	2.22	3.00	
Pearl Millet	PP102M Hybrid	4.35	3.13	3.25	4.02	2.64	3.48	
Japanese Millet		3.55	1.98	3.95	2.78	1.06	2.66	
Foxtail Millet	Manta Siberian	2.91	2.51	2.49	2.16	1.52	2.32	
Foxtail Millet	German	2.64	2.92	2.52	3.56	2.61	2.85	
Soybean	B076RR (RM0.7)	2.33	1.33	1.10	2.90	na	1.91	
Soybean	X53252RR (RM2.5)	3.00	1.45	1.46	2.92	na	2.21	
Barley	Westford	1.16	1.43	2.02	1.17	0.86	1.33	
Barley/Pea	Robust/Trapper	2.01	1.73	1.44	1.54	1.26	1.60	
Oat/Pea	Jerry/Trapper	2.26	1.64	1.39	1.56	1.25	1.62	
Alfalfa	WL 319HQ	0.95	0.38	na	1.63	0	0.74	
LSD (0.05)		0.78	0.78	0.78	0.88	0.89		

¹ ARL = Arlington, MAR = Marshfield, SPO = Spooner (irrigated), STP = St. Paul, and PEL = Pelican Rapids (Otter Tail Co.).

Table 4. Range in forage quality of emergency forages grown in Minnesota in 2002 averaged across three planting dates and two locations. PRELIMINARY DATA

Crop	CP	NDF	TDN
	----- % of DM -----		
Corn (81 day)	8-10	31-61	50-75
Corn (95 day)	8-10	36-58	45-72
Corn (103 day)	8-10	32-49	46-75
BMR Forage Sorghum	7-9	46-61	49-62
Sudangrass	8-23	47-69	41-53
Sorghum-Sudan	9-22	46-69	44-56
Pearl Millet	9-25	45-65	43-56
Japanese Millet	12-23	46-64	45-59
Siberian Foxtail Millet	13-19	58-65	39-47
German Foxtail Millet	11-18	55-68	40-49
Soybean	15-22	36-53	47-60
Barley	16-24	48-59	42-55
Barley/Pea	15-20	49-58	42-56
Oat/Pea	13-20	50-65	40-54

TDN calculated from NDF digestibility as measured by Univ. of Minnesota Forage Quality Lab.

Acknowledgements: The authors wish to recognize and thank 1) the Minnesota Department of Agriculture for partially funding this project via their Sustainable Agriculture Demonstration Grant program; 2) David and Julian Sjoström for their tremendous cooperation in providing the Ottertail Co., MN, field site and site preparation; and 3) Agassiz Seed, CROPLAN Genetics, Mycogen Seeds, and Olds Seed Solutions for providing seed for the trials.