EMERGENCY AND ALTERNATIVE FORAGES

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Alfalfa winter injury, alfalfa winterkill and drought potential in parts of the four-state region prompts the need for emergency forages. Alfalfa in pure stands or mixed with cool-season grass is the most predominant hay forage grown in the region. Emergency forages have been used to provide winter and mid-summer feed/forage to extend the grazing period or provide early grazing before perennials like alfalfa are available.

Both cool-and warm-season annual grasses are available for use as emergency forages in the region. Ideally, emergency forages should be capable of producing high herbage mass as quickly as possible. Additionally, the herbage should be highly palatable and nutritious Typical examples of such forages are warm-season summer annual grasses (i.e. corn, sorghum, sorghum-sudangrass, pearl millet, foxtail millets) and cool-season annual grasses (i.e. oats, barley, triticale, wheat). Annual legumes such as annual medics and certain pulse crops (i.e. soybean, cowpea, mungbean, field pea, pigeonpea) are emergency forage options capable of supplying higher levels of crude protein.

Table 1 - Forage yield and quality of some alternative forages grown in MN, NE and SD. Planting dates varied from early May for cool-season annual grasses and annual medics to mid June for warm-season grasses and legumes.

Forage Crop	DM %	DMY T/acre	CP %	NO_3N ppm	NDF %	ADF %	IVDMD %
Barley	40	2.1	8.2	220	65	43	69
Oat	30	1.8	9.5	360	65	34	73
Triticale	38	2.1	9.3	130	66	36	70
Pea	26	1.1	17.1	-	40	33	71
Turnip	40	2.1	17.5	-	20	23	77
Sorghum	22	2.7	9.6	960	59	30	78
Foxtail millet	32	1.4	8.9	320	61	32	73
Annual medics	100	1.4	18.6	-	38	27	80
Cowpea	100	2.0	20	-	36	22	72
Mungbean	100	1.1	20	-	-	-	70
Soybean	100	1.9	21	-	45	21	66

Sources: Twidwell et al. 1992; Zhu et al.1996; Weichenthal et al. 2003.

Table 2 - Forage DM yield of foxtail and pearl millet sown alone or in mixtures with foxtail dalea, a warm-season annual legume, planted in mid June and harvested at two dates at the Northeast Research Station in Watertown, SD in 1998.

Forage species	Seeding rate	26 July 1998	16 August 1998
	lb/acre	----DM Yield (ton/ac)----	
Foxtail millet	25	1.8	4.0
Pearl millet	20	1.9	5.0
Foxtail millet / Foxtail dalea	20 / 12	1.7	3.6
Pearl millet / Foxtail dalea	15 / 12	1.4	4.6
LSD (0.05)		0.7	0.7

Source: Unpublished data from Owens, 1998.

When harvested at earlier stages of maturity, summer annual grasses provide good quality forage for livestock. Delaying harvest to later maturity stages increases yield but sacrifices quality (Tables 1 and 2). Producers must choose between forage yield and forage quality needs in the context of the animals being fed to determine optimum harvest timing.

Yield performance of some emergency forage options as influenced by planting date from a trial conducted at 5 locations across MN and WI in 2003 is shown in the table on page 6. Data reflect dry-summer performance across the region. Data also suggest corn silage is ideal for high-energy forage tonnage, even planted as late as 1 July. BMR forage sorghum had impressive production, but yield would be less in cooler years. Sorghum-sudan, sudangrass, and pearl millet all performed well for immediate-term forage from late spring/early summer planting, producing 2-3 cuttings. Foxtail millet provided consistently clean stands and good yield in one cutting approx. 2 months after planting, and can provide an easy, short-term forage crop, followed by an August (no-till) perennial forage crop seeding.

Under stressful environmental conditions (i.e. drought, frost) summer annual grasses may accumulate nitrates. In addition, drought or freezing injury may result in a build-up of prussic acid (hydrogen cyanide) in some summer annuals such as sorghum, sudangrass, and sorghum-sudangrass. Prussic acid poisoning is not a problem in millets.

In some cases spring planted winter cereals can be used as forages. When winter annual cereals are planted in the spring they will not elongate to flower due to high vernalization requirements. They will remain vegetative and maintain high forage quality suitable for dairy operations. The small grain cereals can be grazed or harvested as silage; however, haying is difficult due to the long curing time needed to reduce moisture content. Successful small grain cereal grazing requires several precautions because: (1) grass tetany (sometimes known as wheat poisoning) is associated with magnesium and calcium nutrient imbalances and can occur with older cows or calving cows, (2) bloat, though not as common as legume-induced bloat, can occur with immature wheat in the leafy stage, particularly in stocker cattle, and (3) nitrates can accumulate under drought stress.

Brassicas (varieties of kale, canola and turnips) can provide grazing in summer and late fall. Late fall grazing provides the best performance on brassicas which are usually ready for grazing 45-60 days after planting (when plants are 5" tall and capable of maintaining forage quality even after freezing temperature). Experience in SD shows it is best to plant brassicas in summer before 1 August for optimum production.

Table 3. Total season forage DM yield of emergency forages planted in **early June** at 5 locations across Wisconsin and Minnesota in 2003.

		Wisconsin			Minnesota		
Species		**ARL**	**MAR**	**SPO**	**STP**	**PEL**	**AVG.**
		----------DM Yield (ton/ac)----------					
Corn	80-85d (1877)	6.8	4.6	5.1	5.0	5.2	5.3
Corn	90-95d (2395)	8.4	4.7	6.5	5.6	5.4	6.1
Corn	100-105d (2587)	8.8	4.7	5.7	4.9	4.3	5.7
Forage Sorghum	Dairy Master BMR	15.5	4.5	7.3	5.4	4.4	7.4
Sudangrass	Greenleaf	4.4	2.8	4.1	3.8	3.7	3.7
Sorghum-Sudan	Greentreat IV	-	2.4	2.8	3.4	3.2	2.9
Sorghum-Sudan	Drip-O-Honey BMR	5.5	2.9	3.0	3.5	2.8	3.5
Pearl Millet	PP102M Hybrid	4.8	2.8	3.4	3.6	2.8	3.5
Japanese Millet		2.6	1.9	3.7	3.0	0.6	2.4
Foxtail Millet	Manta Siberian	3.4	2.4	2.7	4.6	1.7	3.0
Foxtail Millet	German	3.0	2.4	3.6	4.9	3.4	3.4
Soybean	B076RR (RM0.7)	2.5	2.3	3.0	3.7	2.1	2.7
Soybean	X53252RR	3.1	2.5	2.8	3.8	2.3	2.9
Barley	(RM2.5)	1.9	2.7	1.4	2.0	1.3	1.9
Barley/Pea	Westford	2.7	2.4	0.9	2.2	1.7	2.0
Oat/Pea	Robust/Trapper	2.3	2.6	0.7	2.5	1.1	1.8
Alfalfa	Jerry/Trapper	1.2	0.9	-	1.3	0.4	0.9
LSD (0.05)		0.8	0.8	0.8	0.9	0.9	

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

The MN and WI authors wish to acknowledge and thank the MDA Sustainable Agriculture Demonstration Grant Program and the NCR Sustainable Agriculture Research and Education Producer Grant Program for their support of this research.