17. MCVET Annual Forages evaluation

Project duration

- 2021

Collaborators

- MCVET
- Shawn Kabak & Tim Clark, ARD

Objective

– To test registered varieties of annual forages for yield and feed quality.

Results

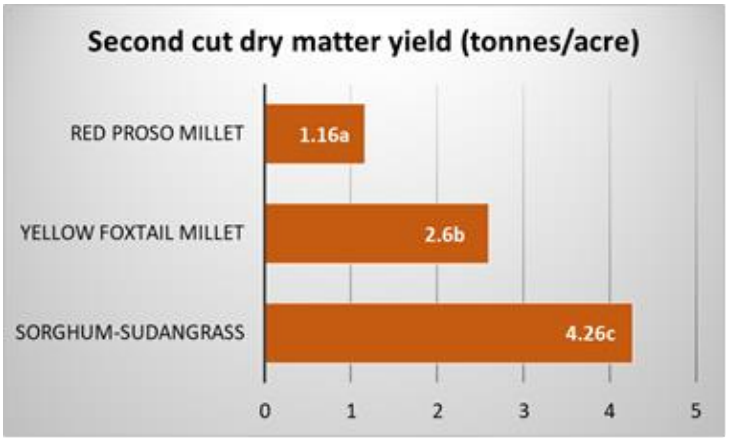

Fig. 17.1. Forage dry matter yield (tonnes /acre) of three millet species at second cut.

Haymaker Oats, Peas/Barley mixture, Peas, Yellow foxtail millet were the top performers in respect of forage yield (Table 17.1). Spring Triticale had the lowest forage yield and crude protein content. Haymaker Oats also had the lowest crude protein content among the forage species. Relative feed values (RFV) was relatively lower in Haymaker oats, Yellow Foxtail millet, red proso millet and sorghum-sudan grass than other forage species evaluated at Arborg. Millets also produced significant amount of forage yield at second cut. Sorghum-Sudan grass produced more forage yield than yellow foxtail and red proso millets (Fig. 17.1).

Table 17.1. Forage species evaluated for forage yield and feed quality at Arborg.

Crop	Variety	Seed rate (seeds/m^2)	Dry matter yield (tonnes/ac)	RFV	CP (%)	TDN (%)
Barley	AB Advantage	250	3.66 bcde	119	12	67
	AB Cattelac	250	3.54 bcd	130	12	70
	AB Hague	250	3.62 bcde	129	12	69
Oats	Arborg	220	3.33 bc	128	11	70
	Haymaker	220	4.04 def	97	10	62
Spring Triticale	Common	265	2.34 a	118	10	67
Peas/Barley	CDC Jasper /AB advantage	40/125	4.55 f	125	13	68
Peas/Oats	CDC Jasper / Arborg	40/110	3.05 b	125	12	68
Peas	DL Delicious	80	3.95 cdef	161	18	67
Yellow Foxtail Millet	Golden German	20 lb /acre	4.31 ef	99	13	66
Red Proso Millet	Cerise	20 lb /acre	3.68 bcde	103	14	66
Sorghum-Sudangrass	Common	20 lb /acre	3.37 bcd	102	14	65
LSD (P =0.05)			0.69			

Project findings

Forage species differed in dry matter forage yield when tested at Arborg site. Spring Triticale had the lowest yield whereas millets and Haymaker Oats produced higher forage yield. Millets also showed potential to produce significant yield during the second cut.

Background / References / Additional resources

Cool season annual forage crops such as oats, fall rye, rye grass, barley, wheat, winter triticale, winter wheat are being used and researched extensively in Canada. (McCartney et al 2008). Warm season annual forage crops include corn, sorghum, sorghum-sudan, millets, brassica crops, hybrids, turnips and other root crops are being considered as potential and need to be researched for forage use in Canada (McCartney et al 2009). Grazing season in the Prairies had been extended by some farmers with the adoption of methods such as stockpile grazing, swath grazing, bale grazing and corn grazing over the winter (Hewitt et al 2016).

A study done by May et al (2007) in south western Saskatchewan found that warm season species such as Golden German foxtail millet yielded similar forage biomass to oats and barley under normal conditions. On the other hand, this study also concluded that warm season crops of sorghum-sudangrass are not suitable for swath grazing in Saskatchewan due to poor and inconsistent emergence at either early (May 15) or late (June 10) seeding dates. However, sorghum –Sudan grass, Proso millets and hybrids had advantage over corn for their drought tolerance (McCartney et al 2009). Proso millet is considered advantageous to replace a failed seeded crop as it matures rapidly. Oats and barley dry forage yield were out yielded by Proso and Crown millet forage dry matter yields under moderate precipitation and by Golden German foxtail millet yields under high precipitation. In addition, crude protein (CP) concentration of Proso, Crown and Golden German foxtail millet (93-97 g kg^{-1} DM) were sufficient to meet nutritional requirements for cattle winter grazing and weathering in the swath did not reduce feed quality (May et al 2007).

Under Manitoban conditions, Hewitt et al. 2016 assessed seven annual forages (oats, barley, fall rye, annual rye, corn, soybeans, and foxtail millet) for nutritive value and yield potential for stockpile grazing. They found that crude protein content was highest in fall rye (21.0%), followed by soybeans (17.0%) and was lowest in corn (8.3%). Conversely, corn, on average, exhibited the highest yield and TDN of all treatments. Despite an average yield of Golden German foxtail millet of 10.9 t DM ha^{-1}, CP concentration (8.3%) and TDN (56%) were low relative to the other annual treatments.

In the Interlake region of Manitoba, higher forage yield was recorded either in cereals grown alone or in blends (Oats and Barley together), however, higher protein content was recorded in cereal / peas blends (PESAI Annual report 2020).

References

McCartney, D., Fraser, J. and Ohama, A. 2008. Annual cool season crops for grazing by beef cattle. A Canadian Review. Can. J. Anim. Sci. 88: 517-533

McCartney, D., Fraser, J. and Ohama, A. 2009. Potential of warm-season annual forages and Brassica crops for grazing: A Canadian Review. Can. J. Anim. Sci. 89: 431-440.

May, W. E., Klein, L., Lafond G. P., McConnell, J. T. and Phelps, S. M. 2007. The suitability of cool and warm season annual cereal species for winter grazing in Saskatchewan. Can. J. Plant Sci. 87: 739-752.

Hewitt, B.S., McGeough, E.J., Cattani, D., Ominski, K.H., Crow, G.H., and Wittenberg, K.M. 2016. Evaluation of seven annual forages for fall stockpiled grazing in beef cattle. Proc. 10th International Rangeland Congress, Saskatoon, SK, July 2016.

Materials and methods

Experimental design – Randomized complete block design
Replications: 3;
Plot size – 8.22m^2
Treatments – 12 forage species (Table 17.1)
Seeding depth – 0.75 inch
Harvesting stage -

- Barley: early dough
- Oats: early dough
- Triticale: early dough
- Millet /Sorghum: early heading
- Peas- full pod stage
- Mixtures- when earliest crop is soft dough stage

Data collection

Yield was taken using a forage harvester. Wet weight of forage material collected per plot was recorded. A sub sample was taken from each plot and forage material was dried down to calculate % moisture for each plot. A composite sample was taken for each species and sent to Central Testing Lab for feed quality analysis.

Agronomic information

Stubble, soil type – Fallow, Heavy clay
Fertilizer applied: N – 50 (lb /acre) and P - 20 (lb /acre) at the time of seeding
Pesticides applied: Silencer @ 34ml/acre on July 13 and July 29 for grasshoppers control
Seeding date – May 20, 2021
Harvesting date– Aug 6 / Sep 17, 2021