Western Beef Development Centre
Division of PAMI

Annual Forage Crop Yield Response to Water

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Introduction

Annual crops harvested for silage, greenfeed, or swath grazing are increasingly used by beef producers in Western Canada. We evaluated three barley cultivars and two millet species on a water gradient for three years at Swift Current, Saskatchewan. CDC Cowboy barley exhibited the highest forage yield at all four water levels. Golden German millet and Siberian millet were lower yielding than barley at all water levels. In the Brown soil zone of Saskatchewan, barley will produce more forage than millet. However, forage quality was not evaluated in this study.

Trial Management

CDC Cowboy barley, CDC Dolly barley, Newdale barley, Golden German millet, and Siberian millet were seeded at Swift Current, Saskatchewan on May 27, 2004, May 20, 2005, and May 31, 2006 in 12 m long plots with six replications. The experiment was fertilized with 55 kg N/ha and 20 kg P2O5/ ha at seeding. A line-source sprinkler system was set up at the centre of the experiment perpendicular to the plots. This system applies the most irrigation water adjacent to the sprinklers with a decreasing amount with increasing distance from the sprinkler heads. Rain gauges set at 1 m intervals between plots and perpendicular to the irrigation system monitored the amount of irrigation water applied. Rainfall from seeding to harvest was also monitored. Four subplots representing four water levels were harvested when barley was at the mid-dough stage of maturity. The lowest water level represented rainfall only (zero irrigation) in each year. In 2004, the millet crops were green with hard seeds at harvest. In 2005 the millet crops were heading, while in 2006 they were still vegetative. The amounts of precipitation and irrigation were 223, 322, 404 and 421 mm in 2004; 158, 211, 237, and 281 mm in 2005; and 127, 163, 198 and 237 mm in 2006. Forage yields are reported in kg dry matter per ha averaged over the three years in Figure 1.

Results

Barley forage yields were higher than millet forage yields at all four water levels. However, the seeding and harvest dates favoured the barley crop more than millet. If June seeding dates and later harvest dates had been utilized, we would expect higher forage yields from the millets. In other experiments during these years, we observed that millet forage yields were correlated to rainfall in July and August at Swift Current (Jefferson, unpublished). This observation is consistent with the millet forage yield response to increasing irrigation water in this experiment (Figure 1).

Among the barley varieties, CDC Cowboy exhibited the highest, or nearly the highest, forage yield at all four water levels. This cultivar selected for forage production rather than grain yield and exhibits forage yield stability across a range of growing-season rainfall. It is a new option for beef producers who use barley as an annual forage for feed production.

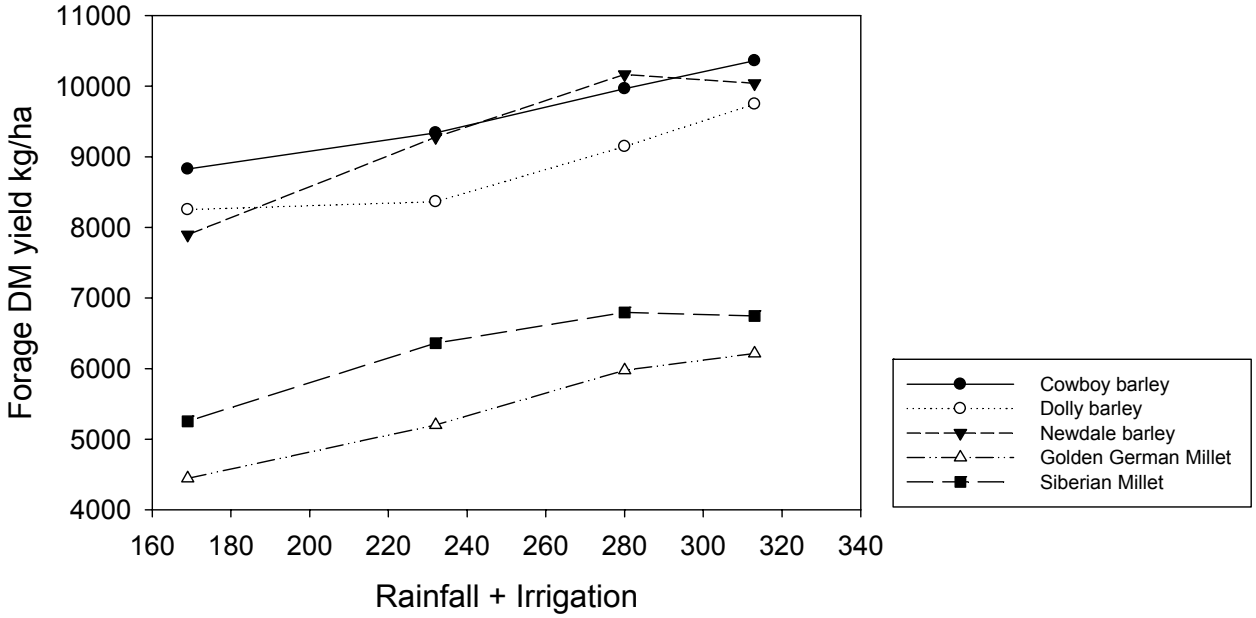

Figure 1. Forage yields averaged over three years

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