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Swath Grazing Management Affects Carrying Capacity, Cow Well-Being and Economics

Vern Baron, Forage Physiologist
Arvid Aasen, Pasture/Agronomy Specialist
Duane McCartney, Forage/Beef Systems

We know that swath grazing is better than feeding greenfeed because it is cheaper feed per cow/day. We also know that baling, feeding and transportation costs are eliminated with swath grazing. Carrying capacity also makes a difference.

Research at the Lacombe Research Centre showed that over four years carrying capacity ranged from 355 to 195 cow-days per acre (Table 1). It costs about the same per acre no matter what the carrying capacity. This means that during the low year daily feed costs were almost double (1.8) what they were in the high year. No wonder good producers want to get carrying capacity as high as possible!

Carrying capacity is influenced most by yield, utilization and daily consumption.

The low end of the range for yield was due to late planting and that had the biggest impact on carrying capacity over the four years of research. So ... don't plant too late!

In This Issue

Generally, the high forage quality of spring cereals and the relatively low energy requirements of beef cows in mid-gestation allows producers to limit graze with an electric wire.

Table 1. Range in barley yield, utilization, daily consumption and carrying capacity for swath grazed barley over four years.

Yield	2.9- 3.7	tons/ac
Utilization	76 - 92	%
Daily consumption	19-29	lb/day
Carrying capacity	195-355	cow-day/ac

The forage quality shown in Table 2 indicates that, while digestibility and NDF (affects intake) change from fall to winter, the nutritive value is more than cows require at mid-gestation.

This justifies limit-grazing. A 1480 lb. cow requires about 20 lbs. of swath dry matter/day at mid-gestation and 23 lbs./day in late gestation to maintain her weight in winter.

On average, our cows had a wide range in daily consumption - mostly above the limits (Table 1). The range is due mainly to management and, to a point, nutritive value.

So, even under good management with an electric wire, daily consumption varied by almost 50%.

Many producers try to maximize carrying capacity by increasing utilization (reducing waste), with the understanding that their cows are consuming high quality forage, and if shorted for a day it's no big deal. Despite what we hope for, cows won't eat 100% of the swath. They will trample some into the ground.

In our low year (Table 1), the swath froze to the ground and the cows couldn't apprehend the forage, so utilization dropped by about 20%.

How long we leave cows out on a swath allotment to clean up more of the swath is a dilemma. The cost to cow health and care may be larger than loss of feed. In the end that decision is up to the producer.

The loss in quality between fall and winter on the swath is relatively low (Table 2). However, there is a big change in quality from the time the cows move onto fresh swath until they are moved again (Table 3).

In fact, the nutritive value of the swath residue just before moving is between the value of straw sampled in September from the same field (Table 3) and cow minimum requirements.

Cows that are given a two to four day quantity of swath will consume a lot more on day 1 and 2 and may consume none on day 4. How much they consume will be due to ease of access, nutritive value, swath fouling and weather conditions.

If we let the cows in this study graze in September, potential intake requirements, based on quality, would be 19 lbs. for mid and 22 lbs. dry matter/day for late pregnancy cows. A small weight gain would be expected if limited grazing allowed 22 lbs./day consumption at mid-pregnancy.

Cows that grazed halfway through the grazing period (day 3 of a 4 day swath allocation), when feeding value might be close to that of straw, requirements went up to 31 to 34 lbs. dry matter/day for mid and late pregnancy cows, but potential intake was down to 23 lbs./day.

In this case weight loss would occur. Over a four day grazing period, dry matter intake would be near potential on day 1 and well below on day 4 due to the reduction in nutritive value (Table 3). Availability would also be reduced.

Table 2. Change in barley swath nutritive value over winter.

	IVDOM	NDF	Crude Protein
		%	
Sept.	61	58	14
Nov.	57	62	12
Feb.	54	62	12

IVDOM is in vitro digestible organic matter
NDF is neutral detergent fiber

Table 3. Nutritive value of barley swath and residue before swathing in September and before and after grazing in winter.

	Before Swathing September		Winter Nov. -- Feb.	
	Grain & Straw	Straw	Before Grazing Swath	After Grazing Residue
IVDOM %	61	50	57	46
NDF %	58	61	67	73
Crude Protein %	13	12	12	9

IVDOM is in vitro digestible organic matter
NDF is neutral detergent fibre

Leaving cows on swaths for extended periods, just to force cows to clean up swath, could be counter productive.

We've talked about four day swath rationing moves. Moving animals more often will help keep daily rations more stable and can help control swath losses. In fact, in harsh conditions or with cows approaching calving, daily moves would be desireable.

There are more effective ways of increasing carrying capacity than "shorting" cows to increase utilization. The most effective way is to maximize yield by planting early. Also choose species and varieties that aren't susceptible to the late planting yield loss. This aspect of swath grazing management is now under study.

For more information contact Vern Baron, Western Forage/Beef Group at 403-782-8109; Email: baronv@agr.gc.ca

Coming Events

How Planting Date Affects Yield and Harvest Time of Swath Grazing and Greenfeed

Arvid Aasen, Pasture/Agronomy Specialist

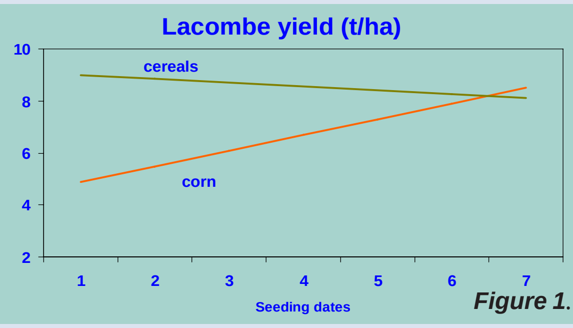
Vern Baron, Forage Physiologist

Previous research conducted by the late Dr. S. Kibite, at the Lacombe Research Centre, indicated large whole-plant yield losses as planting was delayed from mid May until late June. The losses were about 40% for barley and 30% for oat. The late June planting dates are typical of those used for swath grazing. Unfortunately the savings made through swath grazing are eliminated by the effect of late planting on yield. In the Kibite study there were only two planting dates which was not enough to develop a good relationship between planting date and yield. This new trial we are carrying out looks at the yield, quality and harvest time from weekly seeding dates from mid May until the last week of June. We want to know when to plant to predict swathing times without sacrificing yield.

Sufficient interest in grazing corn exists to determine yield comparisons in early planted corn to small grain cereals as their planting date is delayed. As small grain planting date is delayed, their lower yield causes corn to become more competitive on a cost of feed per day basis. This same information is of use for silage production as late planting is often used to spread out silage harvest.

In this trial, barley, oats and triticale seeded at seven weekly seeding dates were compared to corn seeded on May 15. A corn harvest was taken at each of the cereal harvests for comparison. This trial was done at Lacombe, AB and at Falher, AB in cooperation with the Smokey Applied Research and Demonstration Association. We have compiled the first year's data and put together some graphs showing trends from the trial.

When we look at Figure 1, the trend at Lacombe shows a decrease in the yields of the cereals as we delay seeding. This was more significant with barley than the oats or triticale. Early seeding may increase tillering and reduce the effects of disease. Small grains exposed to longer days by planting later or further North may take fewer days from planting until heading; corn may take longer to silk. At Falher, the cereal yields actually increased with the delayed seeding which is contrary to what we expected. This difference may be due to growing conditions during the growing season or possibly the longer growing days in the Peace region. At both sites the corn yields increased throughout the growing season as it took advantage of the entire growing season.



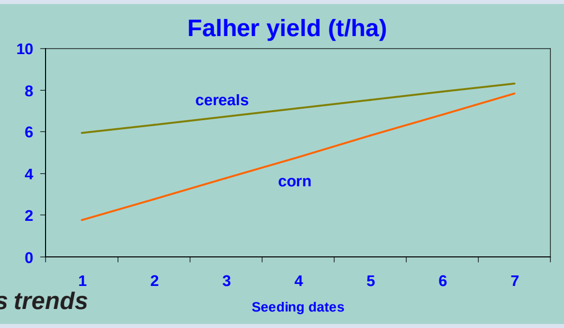


Figure 1. Whole plant yields trends

The in vitro total digestibilities (IVTD) (Figure 2) of the cereals at Lacombe were the same as the corn, with a slight decrease in digestibility of the cereals as seeding was delayed. At Falher, the cereal digestibility trend was similar to Lacombe although the corn digestibility was considerably higher than the cereals at Falher.

Table 1 shows the days from seeding until harvest at both sites. These days from seeding are an average of all the cereals, with barley being earlier to mature and triticale being later. The long growing days in the spring and early summer at Falher had an effect on the days to harvest, as the days increased from 74 to 89 days from the first seeding date to the seventh seeding date.

At Lacombe, the days to harvest remained constant at around 82 days over all the seeding dates. The longer days leading up to June 21 reduces the days to flower in cereals which will reduce days to harvest. Up until the 4th planting date Falher took fewer days until harvest than Lacombe. After the 6th planting date, June 19, Falher took more days. The May 15 seeding was

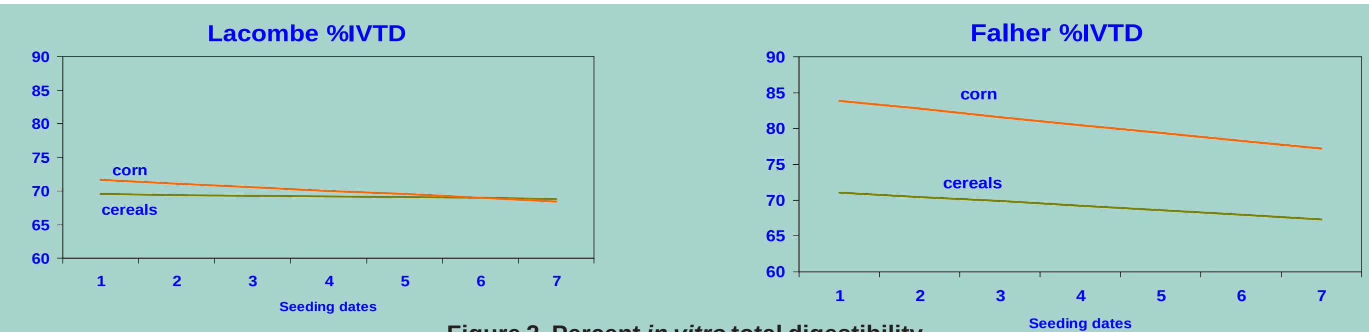


Figure 2. Percent *in vitro* total digestibility

harvested July 29 at Falher. This may be too early for fall and winter swath grazing. At Lacombe, that seeding date would be harvested August 8. The 5th seeding date which was seeded on June 12 was harvested on September 1st at both Falher and Lacombe. Growing conditions will have a major affect on days to harvest as well.

Table 1. Days from seeding to harvest – Average of all cereal crops

	Seeding date							
	1	2	3	4	5	6	7	Mean
Lacombe	84	82	83	83	82	81	78	82
Falher	74	75	78	78	82	85	89	80

Seeding dates weekly beginning May 16 until June 27

This was the first year of a three year study. Although the results are inconclusive with the limited data, we look forward to this year's trial to see if these trends continue. We are very interested in finding if barley, oat and triticale respond differently for harvest times when planted over a range of weeks in the spring at these Northern locations with different photoperiods.

For more information contact Arvid Aasen, Western Forage/Beef Group at 403-782-8027; Email: arvid.aasen@gov.ab.ca

RFID Reader Systems for Use in Beef Cattle

John Basarab, Research Scientist

Lorne Erickson, Juanita Kopp, Kelli Claypool, Don Milligan and Brad Smith

Consumers demand food products which are of high quality and consistency, are safe to eat and have been produced in a responsible and enviornmentally sustainable manner.

Well publicized examples such as BSE in North America have resulted in the closure of markets and billions of dollars in lost revenue. The use of hormones and antibiotics in food animals in North America means that these food products cannot be sold into the European Union.

There is a rapidly expanding requirement in international and domestic markets for source and production practice verification and traceback to validate food safety and quality.

Key to an effective traceability system are Radio Frequency Identification (RFID) systems that work at the speed of commerce, are automatic and require little interference in animal movement to capture the RFID tag number.

A system with these characteristics would greatly facilitate the rapid transfer of valuable management and production information from the farm to the feedlot, packer, processor and consumer. This would also facilitate the flow of information from the consumer, packer and feedlot to the appropriate cow-calf production operation.

The following study presents results from two commercially available, multi-antenna RFID reader systems tested at the Lacombe Research Centre, Lacombe, AB.

Allflex Two Lane Multi-Panel RFID Reader System

The Allflex Multi-Panel RFID Reader System consisted of four antenna panels with power supply, one Octagon industrial computer module, hardwire communication link, a physical wooden housing structure and a laptop computer protection from the weather by an environmental box. Each laneway was 34 in. x 70 in. x 14 ft.

Digital Angel One Lane Multi-Panel RFID Reader System

The Digital Angel Multi-Panel RFID Reader System consisted of six antenna panels with power supply, one Octagon industrial computer module, bluetooth wireless communication between the data acquisition device and a laptop computer, a physical wooden housing structure, and a laptop computer protection from the weather by an environmental box. The alleyway was 58 in. wide by 70 in. in height.

Groups of 20 - 21 weaned calves (550 - 650 lb; 6 - 7 mos. of age) and 18 - 20 Aberdeen Angus cows (1300 lb; 4 - 8 yrs. of age) from the Lacombe Research Centre were used in this preliminary trial.

Each calf had a half duplex (HDX; Allflex USA) RFID button tag in its right ear, while each cow had a full duplex (FDX; Digital Angel, USA) RFID button tag in its right ear.

These two animal grouping were used to form three tag-animal type groups:

- 20-21 calves with half duplex RFID tags (HDX)
- 18-20 cows with full duplex RFID tags (FDX)
- 10 calves with half duplex RFID tags and 10 cows with full duplex RFID tags (50:50 MIX).

The test consisted of running cattle from each tag-animal type grouping through each multi-panel RFID ready system (Allflex and Digital Angel) 10 times on each of four test days. Total possible head opportunities through each RFID reader would be 2400 if all groups consisted of 20 animals (20 cattle x 10 replications x 3 tag-animal groups x 4 days).

Four antenna panels

Six antenna panels

Results

Cattle moved through the Allflex and Digital Angel systems at an average speed of 10.4 and 14.7 km/hr, respectively.

The Allflex Two Lane Multi-Panel RFID Reader System successfully read 99.87% of half duplex tags in 6-7 month old calves, 98.08% of full duplex tags in cows and 97.47% of lots of cattle tagged with a 50:50 mix of half and full duplex tags (calves and cows). This system was recommended for more extensive testing at commercial auction market facilities.

The Digital Angel One Lane RFID Reader System successfully read 96.03% of full duplex tags in cows, 77.74% of half duplex tags in 6-7 mo. old calves and 88.07% of lots of cattle tagged with a 50:50 mix of half and full duplex tags (cows and calves). This system is not recommended for more extensive testing at commercial auction market facilities until it is re-designed. The width of the laneway was 58 in. which frequently allowed two to three calves to pass the antenna at about the same time. Narrowing the laneway to 34 in. and having two lanes would improve the performance of this system.

The hardware and software interface between RFID acquisition and data storage and manipulation for both RFID readers was lacking. A robust computer terminal that is touch screen, has significant memory and operates outside in most weather conditions is required. In addition, much effort is required to build software programs that facilitate data acquisition and analyses such as the real-time acquisition of birth certificates from the CCIA database.

For more information contact John Basarab, Western Forage/Beef Group at 403-782-8032, **Email: john.basarab@gov.ab.ca**

Western Forage/Beef Group Mission Statement:
To improve the profitability and sustainability of the forage-based beef industry through development, integration and transfer of knowledge and technology.

Western Forage/Beef Group Member/Producer Advisory Committee

- David Kerr (Chair), Box 27
  Lashburn, SK S0M 1H0 Ph: 306-285-3609
- Case Korver, R R 3
  Rocky Mountain House, AB T4T 2A2
  Ph: 403-729-2185
- Ron Hamilton, Box 55
  Armena, AB T0B 0G0 Ph: 780-672-9799
- Derrick Reed, Box 156
  Porcupine Plain, SK S0E 1H0 Ph: 306-278-2568
- Ian Watt, Box 88
  Cremona, AB T0M 0R0 Ph: 403-637-2116
- Harvey Yoder, Box 2229
  Lac La Biche, AB T0A 2C0 Ph: 780-623-7069
- Brenda Schoepp, Box 2003
  Rimbey, AB T0C 2J0 Ph: 403-843-3966
- Jess Hudson, R R 1
  Bashaw, AB T0B 0H0 Ph: 780-372-2190
- Arron Best, 7000 - 113 Street
  Edmonton, AB T6H 5T6 Ph: 780-422-2043
- Sarah Davies, Box 2229
  Chetwynd, BC V0C 1J0 Ph: 250-788-1970
- Bonar Hanson, RR 1, Site 7, Box 25
  Olds, AB T4H 1P7 Ph: 403-556-7008

Western Forage/Beef Group Members

- *Arvid Aasen, Pasture/Agronomy Specialist*
  Phone: 403-782-8027/1-800-340-9178
  email: arvid.aasen@gov.ab.ca
- *Vern Baron, Forage Physiologist*
  Phone: 403-782-8109 email: baronv@agr.gc.ca
- *John Basarab, Research Scientist*
  Phone: 403-782-8032/1-800-340-9178
  email: john.basarab@gov.ab.ca
- *Cathy Bryant, Office Administrator*
  Phone: 403-782-8030/1-800-340-9178
  email: cathy.bryant@gov.ab.ca
- *Lorne Erickson, Beef/Forage Specialist*
  Phone: 403-782-8026/1-800-340-9178
  email: lorne.erickson@gov.ab.ca
- *Grant Lastiwka, Pasture/Extension Specialist*
  Phone: 403-782-8028/1-800-340-9178
  email: grant.lastiwka@gov.ab.ca
- *Duane McCartney, Forage/Beef Systems*
  Phone: 403-782-8104
  email: mccartneyd@agr.gc.ca
- *Ken Ziegler, Production Systems Beef Specialist*
  Phone:403-845-8204
  email: ken.ziegler@gov.ab.ca

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Western Forage/Beef Group

A Forage/Beef Agreement between Agriculture & Agri-Food Canada and Alberta Agriculture, Food & Rural Development amalgamating a multi-disciplinary core of scientists, extension specialists, with a producer advisory committee, at the Lacombe Research Centre

6000 C & E Trail, Lacombe, AB
T4L 1W1
Phone: 403-782-8030 or 1-800-340-9178 (within Alberta only)
Fax: 403-782-6120