A Summary of Beef Grazing Practices in Wisconsin

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Introduction

Managed grazing is an effective option for beef producers in Wisconsin. This system, which dramatically increases yield and quality of pasture and focuses on reducing production costs, has potential to improve profitability of beef operations of all kinds. Managed grazing is a size-neutral, flexible practice that can be adapted to any farming system and can be implemented with little cost in equipment and time.

Table 1. Managed grazing at a glance

Number of beef farms using MiG	4763
% of all beef farms	42%
Average herd size	27
Average years using MiG	19
Pasture % of ration	74%
% of farms using cross-breeding	32%
Average culling age (brood cows)	9.1 years
Acres of pasture	92 acres
Length of grazing season	7 months

Managed grazing involves dividing up large pasture areas into smaller paddocks of a few acres in size and rotating the herd from one paddock to the next, with residence times in each paddock of a few days. Pasture productivity is often two or three times higher as a result of the rest period provided between grazing events in each paddock (Undersander et al. 2002). Improved pasture nutritional quality allows for higher weight gains with less supplementation. The substitution of pasture harvested by the cow for mechanically harvested feeds can reduce production costs significantly for dairy producers (Kriegl and McNair 2005). There is no similar dataset on cost of production for beef farmers, but the 2007 Census of Agriculture provides information that suggests that similar cost savings can be achieved.

This report summarizes recent surveys of beef producers using managed grazing. Two sources were used for the study. The first is the 2007 Census of Agriculture. In Section 32 of that survey, question 1-G asks if the producer practices 'rotational or management intensive grazing'. Using that question, we sorted the rest of the data based on whether respondents checked that box or not. The second data source was an original survey we designed and sent out in partnership with the Wisconsin Agricultural Statistics Service in early winter, 2010. We generated a mailing list from beef producers who checked the rotational grazing box in the 2007 Ag Census and then randomly selected names from that list. We sent out 3307 surveys and 1848 were returned (a 56% return rate).

Characteristics of grazing beef farms in Wisconsin

Data from the 2007 Census of Agriculture

According to the Census of Agriculture, an estimated 4763 Wisconsin beef farms used management intensive grazing (MiG) in 2007 (42% of all beef farms). Cow-calf herds averaged 27 brood cows with another 36 head of young stock, significantly larger than the average herd size on non-MiG farms (19 brood cows and 37 head of young stock). MiG farms owned an average of 203 acres, versus 181 owned acres for non-MiG farms. Forty-seven percent of MiG farms reported renting additional land (an average of 164 acres) while 43% of non-MiG farms reported renting additional land (an average of 172 acres). Totals for both owned and rented acres for MiG and non-MiG farms were similar at 367 and 353 acres respectively.

Total acres farmed per head of cattle averaged 5.8 for MiG farms and 6.3 for non-MiG farms, although the size of farms in both categories suggests that cash grain production is likely a substantial secondary

enterprise for many beef producers. Land values were similar at $2782 and $2849 for MiG and non-MiG farmers, respectively.

MiG farms in the Census averaged 92 acres of pasture or 3.4 acres per brood cow (1.5 acres per head including young stock). Three categories of pasture are identified in the Census. Cropland pasture is pasture on ground that can also be used for producing annual row crops. Permanent pasture is pasture that cannot be plowed due to slope, wetness or other limitation. Woodland pasture is pasture that has tree cover. A majority of respondents (78%) reported relying primarily on permanent pasture, with an average of 58 acres. Forty-two percent of respondents reported crop land acreage averaging 39 acres per farm. In contrast, among non-MiG farms, 66% reported permanent pasture acreage (46 acres) and only 25% reported cropland pasture acreage (26 acres). Woodland pasture acreage was reported by 44% and 33% of MiG and non-MiG farmers, respectively. Woodland pasture acreage averaged 53 acres for both MiG and non-MiG farmers.

Acres of hay grown on MiG farms averaged 55, with just 13% of farms reporting making haylage on an average of 70 acres. Under half of MiG farmers (43%) reported raising corn for grain (an average of 92 acres) and 26% reported growing an average of 28 acres of corn silage.

MiG farms were more likely to fertilize pastures than non-MiG farms (23% vs. 10%) and they fertilized more acres (50 vs. 43). Both MiG (61%) and non-MiG (52%) farmers reported using manure on pastures for fertility. Participation in government conservation programs was very low for both categories at 12% and 11% for MiG and non-MiG respectively. Participation in crop insurance programs was similar between the categories at 21%. Those that did report using crop insurance tended to be larger farms averaging 234 and 270 acres enrolled for MiG and non-MiG respectively. Very few beef producers reported using organic production practices at 3% (114 farms) among MiG producers and 1% (52 farms) among non-MiG producers.

Demographics

There were no differences between MiG and non-MiG farms for most demographic questions. Operator age averaged 54 and 55, respectively. Farmers reporting a majority of their income from off-farm sources totaled 52% for MiG and 51% for non-MiG households. About 69% of MiG households reported having internet access and 34% reported having a high speed connection. Among non-MiG farms, 54% reported having internet access, with 24% reporting a high speed connection.

Herd Size Comparison

Figure 1. Herd sizes on MiG and non-MiG beef farms.

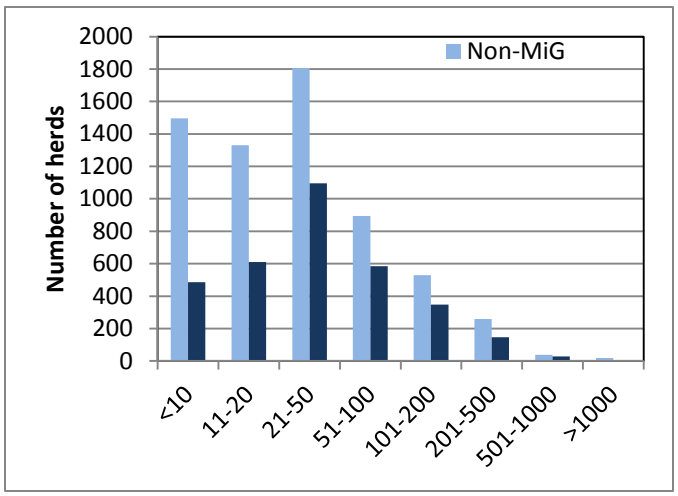


Figure 1 shows the breakdown of MiG and non-MiG beef farms by size. Herd sizes were compiled by including all cattle on the farm including brood cows, calves less than 500 pounds, and calves over 500 pounds. For both MiG farms and non-MiG farms, the largest number of herds fall in the 21 to 50 cow range, but the proportion of herds that do not use MiG increases as herd size declines. More than half of herds in each category greater than 20 cows use MiG, while only 28% of farms with fewer than 20 cows use MiG.

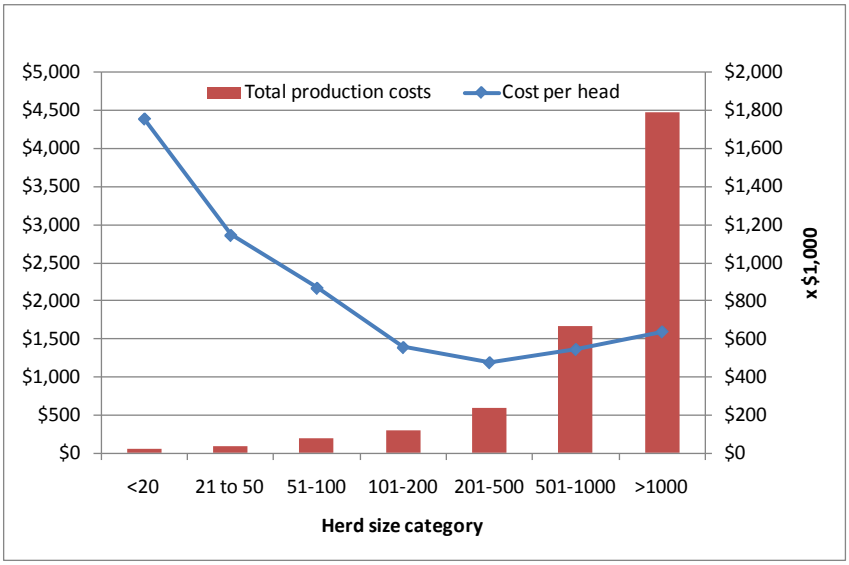
Financial Performance

Table 2. Production costs per cow for MiG and non-MiG Beef farms from the 2007 Census of Agriculture.

Cost Category	MiG Beef Farms	Non-MiG Beef Farms	Percent MiG: Non-MiG
Hired labor	$258	$352	0.73
Feed cost	$144	$193	0.75
Equipment rent	$75	$118	0.64
Custom work	$54	$80	0.68
Chemical cost	$78	$98	0.80
Land & facilities rent	$190	$231	0.82
Depreciation	$207	$264	0.78
Fuel cost	$73	$88	0.83
Repairs cost	$110	$130	0.85
Fertilizer cost	$130	$171	0.76
Utilities cost	$40	$51	0.78
Total	$1359	$1776	0.77

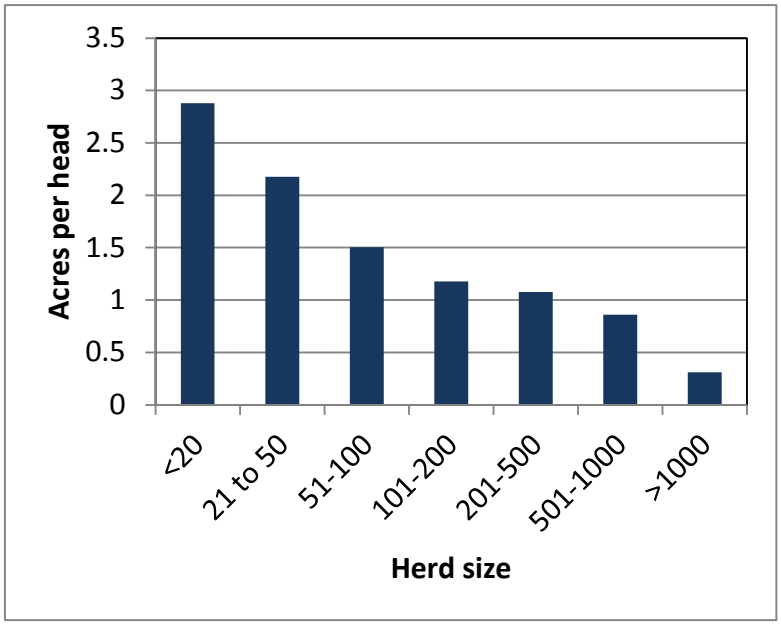
The 2007 Ag Census asked for cost of production information in 11 categories (see Table 2). Cost of production per head of cattle for MiG farms was lower at $1359 than for non-MiG farm, which was $1776 per cow. Cost of production was lower in all categories for MiG farms, with the largest differences in the cost of equipment rental, custom work, and hired labor. Of the 11 categories surveyed, MiG farms had lower costs by 20% or more in seven categories.

Figure 2. Cost of production per head and total for the farm.



Cost of production per head for MiG farms decreased as herd size increased to about 100 head, and then leveled off at $1300 to $1500 per head (Figure 2). Cost of production per market animal (excluding brood cows) averaged $2173 for herds of 51-100 head, $2866 for herds of 21-50 head and $4390 for herds below 20 head. These data suggest that there is an economy of scale at work, above which additional cattle do not add significantly to operational costs. A relatively small proportion, about 24% of MiG farms currently are large enough to take advantage of these cost savings.

Figure 3. Acres per head on MiG beef farms.



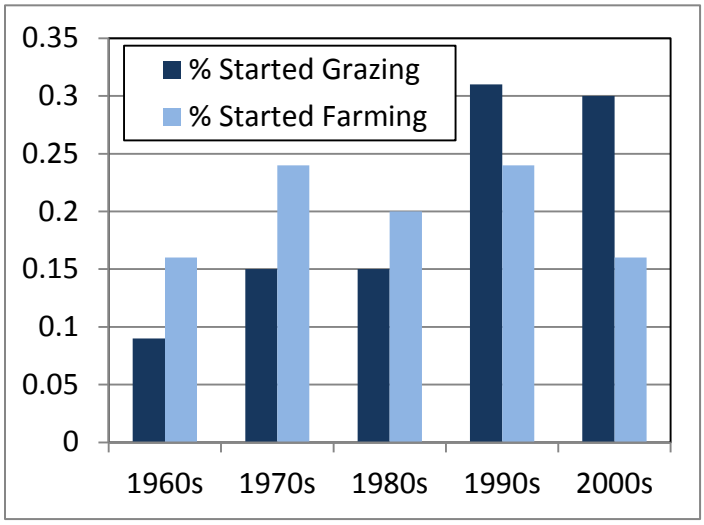
Pasture acreage increased with herd size, while pasture acres per head decreased. In Figure 3, average pasture acreage per cow is shown by herd size. A common rule-of-thumb suggests that at least one acre of pasture per cow can provide adequate grazing acreage for the growing season. The smallest grazing beef farms with fewer than 50 cows had between two and three acres of pasture per cow. Farms between 51 and 500 cows averaged between one and 1.5 acres per cow and the two largest herd sizes had less than one acre per cow.

How graziers manage their farms

Data from the 2010 beef grazing survey

Timing and Motivation for Adoption of Managed Grazing

Figure 4. Timing of adoption of managed grazing.



A majority of MiG farmers (56%) began using a managed grazing system when they started farming. Twenty-two percent of MiG farmers reported that they transitioned to managed grazing within ten years of starting farming, 9% transitioned from 11 to 20 years later, and 13% began using managed grazing more than 20 years into their farming career. Figure 4 shows adoption of MiG over time among respondents. Adoption of MiG by survey respondents peaked in the 1990s with 31% reporting adoption of MiG during that decade. It has remained high in the 2000s with 30% of respondents reporting that they adopted MiG during that decade. The proportion of beef operations using MiG as of 2007 was estimated at 42%.

Graziers were asked why they started using MiG and what their level of satisfaction was with their grazing system. Among the four choices, reducing production costs/increasing net income was most often selected (83%), followed by reducing labor/having more time for family (68%). Improving animal

health was selected by 64% of respondents. About half of respondents (49%) indicated a desire to improve the environmental performance of their farm as a primary reason for using MiG. Ninety percent said they were satisfied or very satisfied with their systems.

Forty-nine percent of respondents said that they would like more information provided by agencies. Current sources of information in order of usage were: magazines, books and newspapers (61%), pasture walks (27%), conferences (13%), field days (13%), internet (18%), workshops (12%), and other (13%). Fifteen percent of respondents reported having had assistance in developing a managed grazing plan by a trained grazing specialist or planner.

Pasture management

Rotation. For optimal pasture management, the recommendation is to rotate (move) cattle to a new paddock at least every three days, to avoid the risk of grazing new pasture regrowth (Undersander et al 2002). Rotation from a paddock is followed by a period of rest designed to allow plant recovery and accumulation of forage for the next grazing event. The more often the herd is moved, the more rest time each paddock receives resulting in higher quality and quantity of pasture forage. Often, the animals on a beef farm with the highest nutritional needs are 'finish animals', steers and heifers being fed during their last six months to slaughter weight. Only 14% of respondents reported moving their finish animals more often than every one to three days. Four percent moved finish animals every four to six days, 17% once per week and 19% less often than once per week. Set stocking of finish animals was reported by 46% of respondents, many of whom may finish on a grain-based ration. An average of 72% of respondents reported feeding grain to their finish animals.

Approximately 17% of respondents reported moving their brood cow herd every one to three days and 18% moved their weaned calves that often. An average of 66% reported moving their cows and calves to new pastures from every four days to less often than once a week. An average of 17% reported set stocking these classes of animals on their farms. Pasture quality can be increased or decreased through management of the rest-rotation cycle, and the producer must balance the role of pasture and its quality with other components of the ration he or she feeds. Rotation lengths vary based on those management decisions.

Start and end of grazing season. A majority of respondents (66%) reported that their grazing season starts in May, with 31% starting in April, and 3% starting in March. Fifty-four percent of MiG farms graze cattle into November, while 40% end their grazing season in October. Six percent reported taking cattle off pasture in September. Twenty-one percent of respondents reported use of stockpiling to extend the grazing season.

Stocking rate and pasture acreage. As we found in the Census dataset, stocking rate (acres/cow) decreased with increasing herd size. Stocking rates are calculated by dividing total pasture acres by the sum of all animals on the farm (brood cows, calves and finish animals including yearling heifers and steers). Respondents to our survey reported significantly higher stocking rates than Census respondents did. Among the 1385 respondents to our survey, farms with herds of 1-49 cows reported an average of 72 acres of pasture and had stocking rates of 1.28 acres/head. Farms with herds between 50 and 99 cows averaged 85 acres of pasture and 0.88 acres per head, while farms with over 100 cows reported 180 acres of pasture and had 0.65 acres per head on average (Table 3).

Table 3. Pasture acreage by herd size.

		Total pasture acres reported				
Herd size[1]	Number of farms[2]	Acres grazed only	Acres grazed & cut for hay	Acres grazed & row cropped	Total	Average pasture acres per farm
1-49	1,206	63,314	17,769	5,704	86,787	72
50-99	104	6,009	2,136	656	8,801	85
100+	75	10,149	2,078	1,289	13,516	180
Total	1,385	79,472	21,983	7,649	109,104	79

[1]Includes cows, calves, and finish animals.
[2]Number of farms responding to this question.

Pasture management and renovation methods. The survey asked respondents about their use of a series of common and not-so-common grazing practices. Nearly two thirds (59%) of respondents indicated that they provide water on pasture. Forty-seven percent of respondents reported use of permanent paddock divisions, suggesting that the remaining 53% made use of temporary fencing (e.g. polywire and fiberglass posts) for dividing larger pasture areas into paddocks. Strip grazing, the division of a pasture area into narrow strips, and moving the herd from one strip to the adjacent one using temporary fencing, was used by 15%.

Mob grazing is a relatively new practice in Wisconsin, involving very high stocking densities (100,000 or more pounds of cattle per acre) for short periods of four to six hours. Advocates of this practice report better forage utilization, better weed control and improved pasture plant community diversity and health. This practice is used by 25% of respondents.

Eleven percent of respondents use a leader/follower system. Leader/follower grazing is the practice of grazing two herds of animals through a pasture simultaneously, one immediately following the other. The leader herd generally has a higher nutritional need such as steers being finished, and is allowed to graze off the highest quality top growth and is then moved on in a day or less. The follower herd is a group of lower nutritional need animals such as brood cows. They graze down the pasture to the desired residual level, consuming the lower quality material.

Leaving adequate residual following grazing is essential for rapid recovery and regrowth. The recommendation is to leave no less than four inches or half of the grass leaf area. Residual heights of four to five inches were reported by 34% of respondents, six to seven inches by 10%, and eight to nine inches by 2% of respondents. Fifty-three percent of respondents reported leaving a residual height of less than four inches after grazing a paddock.

Of the acres of pasture reported by survey respondents, 73% was dedicated solely to grazing, with 20% of the pasture acres used both for grazing and hay production. Seven percent of grazed acres were used in rotation with row crops. Seventy percent of respondents reported never rotating pastures with row crops, and 18% reported rotating from pasture into row crops once every four or more years, 10% every two to three years, and only 2% rotated annually between pasture and row crops on some acres.

Pasture renovation can also be achieved by introducing new species into existing pasture sod. However, more than half of respondents reported never frost seeding (60%) or interseeding (54%) to renovate pastures. Frost seeding is the application of seed in early spring by broadcasting over existing pasture. Red and ladino clover are most commonly used and the goal is to have the freezing and thawing of the

ground in early spring work the seed into the soil, allowing for better seed-to-soil contact. While mechanically interseeding into sod with a no-till drill has a higher success rate, frost-seeding is less costly. Among farms using these pasture renovation practices, about 7% do so annually, 22% do so every two to four years, and about 11% and 17% use frost-seeding or interseeding pastures, respectively, every 5 years or more.

Soil testing is used by 31% of respondents, with 24% reporting using nutrient management planning and 38% using commercial fertilizer on pastures. One percent reported using pasture irrigation.

Winter management. Thirty-one percent of respondents reported outwintering their cattle. Outwintering is the practice of feeding and housing livestock outdoors during the winter months. Outwintered cattle are either rotated through a series of paddocks where bales are set out in advance or they are set stocked on a 'sacrifice paddock' that is then renovated the following growing season. Sixteen percent of respondents reported using sacrifice paddocks, 25% use bedded packs, 31% use windbreaks and 13% use compost barns in their wintering system.

Cow-calf herds: Breeds and feeding practices.
A majority of respondents (90%) to the survey can be categorized as cow-calf operations; that is, they maintain a herd of brood cows that calve each year, with the sale of the calves providing the majority of herd income. Calves can be sold at any size, or finished and sold as fat cattle, through a variety of market venues. Table 4 provides a breakdown of beef herds by breed, with cross-breds being the primary "breed" used by 34.4% of producers in Wisconsin. Seventy-two percent of respondents identified themselves as having commercial herds (non-registered); 22% reported raising pure-bred animals, and 6% had both. The top two breeds were Angus at 31.5% and Hereford at 14.7% of the herds. Culling age of cows averaged 9.1 years.

Table 4. Breakdown of MiG farms by breed (total of 1269 respondents to this question).

Breed	Farms	% of all herds	Average herd size[1]	Average weight (lb)	Culling age (years)
Angus	400	31.5%	33	1277	9.2
Simmental	54	4.3%	22	1356	8.5
Hereford	187	14.7%	21	1283	8.6
Shorthorn	21	1.7%	31	1424	9.5
Red Angus	37	2.9%	42	1283	9.4
Limousin	24	1.9%	27	1409	9.2
Scottish Highland	24	1.9%	16	1100	13.1
Galloway	20	1.6%	16	1194	10.5
Charolais	10	0.8%	27	1511	8.8
Other[2]	55	4%	21	1178	9.6
Cross-breeds	437	34.4%	28	1265	9.1
All breeds	1269		27	1267	9.1

[1]Number of brood cows
[2]Includes Devon, Dexter, Gelbvieh, Piedmontese, Maine Anjou, Saler, Lineback, Murray Grey, British, Pinzgauer, Texas Longhorn, Buelingo, White Park, Lowline, Watusi, Santa Gertrudis.

For their cow herds, respondents reported that their current average pasture intake (73%) was significantly lower than their ideal average pasture intake (82%). Twenty-six percent reported moving

their cow herds more often than once per week. Brood cow rations varied with size of operation. More small operations of one to 49 cows reported grain feeding (37%) than midsized farms of 50 to 99 cows (20%) and large farms of over 100 cows (11%). More of these larger farms reported feeding hay or haylage (72% for both midsized and large farms versus 59% for small farms). The same pattern was true for corn silage, with higher proportions of midsized (24%) and large (26%) farms reporting using corn silage, compared to small farms at 14%. Just over one third (35%) of small farms reported feeding no grain or corn silage to their brood cows, while 44% of midsized farms and 51% of large farms reported feeding an all forage diet.

Estimated cow weight averaged 1267 pounds, with a range of 1100 for Scottish Highlands to 1511 for Charolais. In general, continental breeds (Charolais, Simmental, Limousin) tend to be larger framed, and breeds originating in the British Isles (Angus, Hereford, Galloway) are smaller. Cow weight is a consideration for beef producers as the amount of feed needed to keep the cow is directly related to its body size. A standard estimate is that cattle must consume about two percent of their body weight in forage dry matter per day to maintain condition. Comparing the weight of finished animals sold and cow size is a measure of efficiency of the breed. For example, Charolais and Red Angus producers reported similar finish weights for steers at 1325 and 1336 pounds, respectively (Table 5). However, at an average 1511 pounds, a Charolais cow requires 30 pounds of dry matter daily to produce that calf, whereas Red Angus cows at 1283 would require only 26 pounds. This is a difference of three quarters of a ton of feed per year per cow.

Feeding and marketing of calves by weight classes and breeds

Table 5 shows marketing timing by breed for the herds in the survey. Eighty-two percent of producers in all breed categories reported selling most or all of their calves prior to finishing stage. These respondents reported selling an average of 23 calves per year at this stage. Calves were sold at an average age of 11 months weighing 763 pounds. Weaning weights ranged from 440 pounds for Galloways to 547 pounds for Limousins.

Respondents reported targeting a pasture intake of 75% of their calf ration, but currently reaching approximately 68%. Twenty-seven percent of respondents reported moving their calf herds to fresh pasture more often than once per week. A majority of respondents reported feeding hay or haylage (55%) and grain (53%), with a smaller proportion of producers reporting feeding corn silage (13%). The remaining 34% of respondents presumably feed no grain to their calves. Weight gains averaged about 2.1 pounds per day for producers marketing at approximately one year of age.

Forty six percent of respondents reported finishing some of their calves and selling them as fat cattle at about 19 months at an average weight of 1226 pounds (Table 5). These producers reported selling an average of 15 head per year as finish animals. Finish age and weight varied among breeds, with a range from 16 months for Limousins to 28 months for Scottish Highlands.

These farms reported an ideal pasture intake of about 67% of total ration, but said that their current pasture intake was about 63%. Less than 18% of respondents reported moving their finish herds to fresh pasture more often than once per week. Forty-six percent reported never moving this class of animals, suggesting that the animals are probably fed in a feedlot. Fifty-five percent reported feeding their finish animals hay or haylage. The primary supplement to pasture was grain, fed by 72% of operations and 14% reported feeding corn silage. The remaining 14% of respondents presumably feed

no grain to their finish animals. Weight gains across breeds averaged about 2 pounds per day for producers marketing their steers at finish weight.

Table 5. Calf and finish animal data by breed.

Breed		Farms	Herd size	Average weight at weaning (lb)	Average weight at marketing (lb)	Average age at marketing (months)
Angus	Calves	320	28	513	765	10
	Finish animals	145	18		1257	18
Simmental	Calves	40	18	535	841	11
	Finish animals	18	11		1367	18
Hereford	Calves	140	18	469	741	11
	Finish animals	67	8		1220	20
Shorthorn	Calves	16	27	507	671	9
	Finish animals	8	8		1250	19
Red Angus	Calves	30	39	511	756	11
	Finish animals	11	20		1336	18
Limousin	Calves	23	19	547	911	11
	Finish animals	11	13		1298	16
Scottish Highland	Calves	20	9	461	934	20
	Finish animals	12	5		1123	28
Galloway	Calves	20	12	440	1030	11
	Finish animals	16	9		1084	22
Charolais	Calves	8	21	504	929	12
	Finish animals	8	12		1325	18
Other[1]	Calves	41	17	448	744	13
	Finish animals	21	10		1019	21
Cross-breeds	Calves	382	25	504	722	10
	Finish animals	165	16		1238	19
All breeds	Calves	1040	23	499	763	11
	Finish animals	482	15		1226	19

[1]Includes Devon, Dexter, Gelbvieh, Piedmontese, Maine Anjou, Saler, Lineback, Murray Grey, British, Pinzgauer, Texas Longhorn, Buelingo, White Park, Lowline, Watusi, Santa Gertrudis.

Summary

Results of both surveys indicate that farms using managed grazing are successfully substituting fresh pasture for well over half of their ration for all classes of beef animals. Producers are motivated to use MiG by increasing net income, reducing labor, and animal health improvement. While neither survey was designed to determine whether these goals are realized, a 90% satisfaction level among respondents suggests that responding MiG farms are meeting their personal farming goals through use of managed grazing.

As with any survey group, there is a range of producer knowledge and skills represented and interest in improving their management. Nearly half of respondents said they were interested in more information. Nearly all respondents reported that the pasture intake of their cattle was lower than desired. Both surveys identify areas where additional information and assistance could be helpful in making

producers' systems more efficient and effective. Several areas could be targeted for educational resources. Pasture management is a primary one, with less than one-third of MiG producers rotating more often than every three days and more than half of respondents indicating that they do not currently take advantage of other practices that increase productivity and quality such as frost- or inter-seeding, fertilization, and nutrient management planning. This has an impact not only on pasture productivity, but on forage quality, which in turn impacts weight gain. Few respondents reported utilizing management intensive grazing to provide the high quality pasture needed for good weight gains in beef calves. A combination of improving pasture quality and more information on ration balancing on pasture could help boost production with relatively little cost.

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