Value of an Extended Grazing Season and Value of Monensin Supplements for Stocker Cattle Grazing Winter Wheat Pasture

By Karen W. Taylor, Francis M. Epplin, Derrell S. Peel, and Gerald W. Horn

Abstract

This study was conducted to determine the value of two monensin supplementation strategies for steers and heifers pastured on fall/winter wheat relative to the value of a free-choice mineral supplement containing no monensin. A second objective was to determine the value of extending the fall/winter wheat pasture grazing season by either one or two weeks.

Introduction

Lush fall and winter pastures produced by dual-purpose winter wheat offer a valuable source of forage for beef cattle. Growing young steers and heifers on dual-purpose winter wheat is a major agricultural activity in the Southern Plains of the United States. Six million acres are seeded annually to winter wheat in Oklahoma. Two-thirds of the winter wheat planted in the region is intended to produce both fall/winter forage for grazing and grain (True, et al.). In a dual-purpose wheat forage plus grain system, wheat is planted in early September and is available for grazing by livestock from mid-November until the development of the first hollow stem, usually in late February or early March.




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The first hollow stem stage is when the stems begin to elongate or a hollow stem begins forming just above the roots (Redmon, et al., 1995). If cattle are removed prior to development of the first hollow stem, the wheat will mature and produce a grain crop for harvest in June.

Research has found that grazing past the first hollow stem growth stage decreases grain yield (Redmon, et al., 1996; Feiser, et al.). The occurrence of the first hollow stem depends on several climatic factors including temperature and precipitation. Most winter wheat pasture is stocked with young steers or heifers that may be purchased in the fall and sold at the end of the winter grazing season in late February or early March. If the general trend in prices is increasing, the activity can be quite profitable. However, if the general trend in prices is decreasing; that is, if cattle prices decline during the relatively brief period of ownership, the activity can incur losses. In addition, the occurrence of the first hollow stem is weather dependent and in a given year occurs throughout the Southern Plains during a relatively small time window. Thus, many animals in the region are removed from winter wheat pastures and sold over a relatively short time period. This results in seasonal price consequences.

Several factors have motivated this study to determine differences in expected wheat stocker net returns across gender, beginning weight, supplementation strategy, and sale date. Dual-purpose winter wheat and stocker producers are faced with several key decisions that influence the final weight (and value) of the animals. These include the seasonal price pattern, supplementation, and the length of the grazing season.

The Oklahoma National Stockyards in Oklahoma City is the world's largest feeder cattle market. It is centrally located in the Southern Plains region in which winter wheat is pastured during the fall and winter. Prices at other locations in the wheat pasture region at a given time are highly correlated and differ only by transportation costs. Since 1992, the USDA has been reporting Oklahoma City steer and heifer prices in 50-pound increments (USDA). Figure 1 illustrates that the seasonal prices of steers for three weight classes during the critical first hollow stem stage (late February to early March) differ depending upon weight. Historically, prices for heavy (900-950 pound) steers trend down, whereas prices for lighter steers (600-650 pounds) trend up during the first hollow stem period. These price patterns suggest that the profitability of wheat pasture stockers may depend critically upon the weight of animals purchased in the fall, the rate of gain, and the February-March date of sale. The value of a pound of gain in the region depends more upon animal weight during the first hollow stem period than at any other time of the year.

The type of supplement that a wheat-pasture stocker producer chooses to feed influences the final weight and value of the stockers. Most producers in the region provide cattle access to a to a free-choice mineral supplement (Hossain, et al.). Alternatively, they may choose to supplement wheat-pasture stockers with an ionophore such as monensin to increase gain and decrease bloat (Horn, et al.; Horn). However, Hossain, et al., reported that only 18 percent of producers in the region fed monensin.

Part of the winter wheat breeding program in the Southern Plains is devoted to the development of dual-purpose varieties. A recently released variety will provide an additional week of pre-first hollow stem grazing (Carver, et al.). The value of this extra week of grazing may depend critically upon the stocker price patterns. A dual-purpose variety may be required to sacrifice grain yield for either enhanced forage yield or an extended grazing season. Estimates of the value of an additional week of grazing during the critical late February to early March period could be used to provide guidance to the wheat variety development program.

Objectives

This study has two objectives. The first objective is to determine the expected value of two monensin supplementation strategies for steers and heifers pastured on fall/winter wheat pasture with alternative beginning weights, relative to the value of a free-choice high-calcium mineral supplement (containing no monensin). The second objective is to determine the expected value of extending the fall/winter wheat pasture grazing season by either one or two weeks.

Research to determine the net returns of wheat-pasture stocker production from alternative purchase weights and gender, alternative supplementation strategies, and sell dates has not been conducted. This study was undertaken to answer two research questions. The first is, are monensin supplements economical for steers and heifers pastured on winter wheat? The second is, what is the additional value of a winter wheat variety that provides an equivalent grain yield but provides an additional one or two weeks of fall/winter grazing?

Procedures

A total of 81 stocker production strategies were defined. This includes nine purchasing strategies, three supplementation strategies, and three selling dates. Figure 2 includes a flow chart of the strategies. The typical dual-purpose winter-wheat stocker grazing season begins in mid-November, after the stocker calves have been through a three-week receiving program. During the receiving program the calves are treated with medication and prepared to be placed on wheat pasture. The average daily gain is assumed to be one pound per head per day for a period of 21 days.

Kaitibie, et al., reported that the average placement date for stocker cattle on wheat pasture over a 12-year period at the Wheat Pasture Research Unit in North Central Oklahoma was November 12. It is assumed that producers purchase stockers 21 days prior to the placement date. That is, stocker cattle are assumed to be purchased on October 22. Hossain, et al., reported that the Oklahoma state average for beginning weights for wheat pasture steers was 460 pounds and 447 pounds for heifers. This study considers five different beginning weights for steers (375, 425, 475, 525, and 575 pounds) and four for heifers (375, 425, 475, and 525 pounds).

Producers may elect to feed monensin to increase gain and decrease bloat. Those who feed monensin must select a method of feeding. Three strategies are evaluated: free-choice feeding a high-calcium mineral supplement without monensin; hand feeding an energy supplement containing monensin (Oklahoma Green Gold (OKGG)); free-choice feeding a high-calcium mineral supplement containing monensin (R1620).

The Oklahoma Green Gold (OKGG) supplementation program is an energy supplement containing monensin designed to be hand fed at a level of four pounds per head every other day to obtain an average intake of two pounds per head per day (Horn, et al.). Designed experiments have found that the OKGG program increases average daily gain of steers on fall/winter wheat pastures by 0.42 pounds per head per day (Horn, et al.). The market price of OKGG is $150 per ton. The average feeding rate of two pounds per animal per day results in an expected daily cost of $0.15 per head. This does not include the labor cost of feeding the supplement.

In recent years, several feed manufacturers have marketed a mineral mixture containing monensin for stocker cattle. This mixture is typically referred to as an “R1620” formulation and contains 1,620 grams of monensin per ton. The results of studies conducted over three years relative to the use of R1620 mineral mixtures for wheat pasture stocker cattle have been reported by Horn. In general, intake of the mineral mixture averaged about 0.15 pounds per steer per day (123 mg of monensin per steer per day) and daily weight gains were increased by 0.23 pounds compared with stockers given free-choice access to the carrier mineral mixture without monensin. This study assumes that the average daily gain for animals on fall/winter wheat pasture increases by an average of 0.23 pounds per head per day when supplemented with R1620 relative to the carrier mineral mixture without monensin. The market price of R1620 is $580 per ton. Given an expected consumption rate of 0.15 pounds per head per day, the estimated daily cost is $0.04 per head. This does not include the labor cost to feed the supplement. Producers must also effectively manage the intake of R1620 to achieve desired results of increased weight gain.

Labor cost of feeding supplements differs substantially across farms depending upon pasture size, distance from the headquarters to the pasture, and the opportunity cost of labor for individual producers. For this analysis, rather than include a cost for labor, the value of feeding trips necessary to hand feed the OKGG monensin strategy are estimated. It is assumed that the quantity of feed needed for a given pasture could be hauled in a single trip by a single vehicle.

After the fall/winter grazing season, the producer has a decision to either sell stockers early at a lighter weight or sell the stockers later at a heavier weight. Three different sell dates are considered: February 25, March 4, and March 11.

Production data from experiment station trials were used to prepare estimates of expected input requirements and production levels for each of the 81 strategies. Table 1 includes a summary of production assumptions for stocking density, average daily gain, death loss, and veterinary medicine expenses for each beginning weight and gender alternative modeled.

Net returns for each strategy in each year were calculated using:

(1) $NR = [\{P_S \times W_S\} \{1 - DL\} - \{P_p \times W_p\} - C] \times [SD]$,

where NR equals net returns per acre ($), P_S represents the selling price ($/cwt), W_S is the selling weight (cwt), DL is the estimated death loss (%), P_p is the purchase price ($/cwt), W_p is the purchase weight (cwt), C represents costs other than the cost of land, labor, overhead, and management ($/head), and SD equals the stocking density (head/acre). Stocking density is assumed to be 275 pounds (initial weight) per acre and is adjusted with weight. The stocking density for animals with an initial weight of 375 pounds is 0.73 head per acre. In other words, by assumption, 160 acres of winter wheat pasture could provide sufficient forage for 117 375-pound animals. Selling prices that are available in 50-pound increments were linearly interpolated to obtain prices for precise weights. The various values were used as inputs into the base budget to calculate the net returns generated from each strategy for each year.

An enterprise budget was constructed for each of the 81 strategies for each of the 14 years for which prices were available. Table 2 includes the base budgets for steers with a beginning weight of 375 pounds sold on March 11 for each of the 3 supplementation strategies. Net return to land, labor, overhead, and management for each of the 14 years were computed. The averages of these values are reported in the tables and figures.

Results

Table 3 includes computed net returns averaged over the 14 years for each of the 9 gender-beginning weight alternatives for each of the three supplementation strategies with a March 11 selling date. These values were used to determine the additional returns from feeding either R1620 or OKGG to wheat pasture stocker steers and heifers, relative to feeding a high-calcium mineral supplement. The values in Table 3 and Figure 4 are in dollars per acre. Values graphed in Figure 3 are in dollars per head. Based upon the assumptions regarding cost of the supplements, the assumed increase in average daily gains, a March 11 sale date, and 1992-2006 market prices, the value of monensin fed as OKGG ranges from $7 per head for steers with a beginning weight of 375 lb to approximately $17 for 525 lb heifers. On the other hand, the value of monensin fed as R1620 ranges from $12 per head for 375 lb steers to approximately $19 per head for 525 lb heifers.

As reported in Table 3 and reflected in Figure 3, for every gender and weight combination the estimated return from feeding R1620 exceeds the estimated return from feeding OKGG. The estimated increase in daily gain is greater for OKGG. However, OKGG is more expensive per stocker per day. These estimates may be used to determine if it would be economical for a specific producer to supplement with monensin (OKGG or R1620). For example, OKGG is designed to be hand fed every other day. The March 11 sale date follows from the assumption of 119 days on wheat pasture. A producer who followed the OKGG system would be required to hand feed 59 times during the pasture season. The values in Table 3 provide information regarding the potential benefits from feeding either of the monensin supplements. However, these benefits must be weighed against the labor costs that are specific to the farm and pasture situation.

Table 4 includes estimates of the gross returns per trip from feeding OKGG. The estimated gross return per trip, compared to feeding a high-calcium mineral supplement (containing no monensin) depends upon gender, initial weight, stocking density, and pasture size. For a 160-acre pasture fully stocked with 83 525-pound steers at a stocking density of 0.52, the expected additional return to labor and travel from feeding OKGG is $15.10 per head. The cost of the labor and travel would depend upon the distance from the farmstead to the field. If the field was very close to the farmstead, the time and mileage required to feed the OKGG may be minimal, and it may be an economical activity. However, if the field was at a distance from the farmstead, for example 10 miles, the cost to the farmer of the 20-mile round trip may well exceed the $15 in expected benefits. The expected gross return per trip is less for smaller pastures. For example, a 40-acre pasture would be fully stocked with 21 525-pound steers. The expected additional return for the 21 steers is $317 or $5 per feeding trip. This may explain why Hossain, et al., found that only 18 percent of producers in the region indicated that they feed monensin to cattle on wheat pastures. For some farm situations supplementing with monensin is economical. For other situations it is not.

Table 5 includes the estimated net returns in dollars per acre and in bushels of grain from keeping stockers on wheat pasture for both one and two additional weeks after February 25. These estimates were computed based on the cost and gain assumptions associated with the R1620 strategy. The value of extending the grazing season in bushels of wheat is based on an assumed wheat price of $3 per bushel.

Figure 4 includes a chart of the additional expected net returns from grazing wheat for either one or two weeks after February 25 (when stockers are supplemented with R1620). In general, the value in dollars per acre of one additional week of grazing from February 25 to March 4 is less for steers than for heifers. It ranges from $3 per acre for steers with a beginning weight of 575 pounds to $10 per acre for heifers with a beginning weight of 375 pounds. Extension of the grazing seasons adds value to the stocker enterprise.

In general, the value in dollars per acre of two additional weeks of grazing after February 25 is less for steers than for heifers, and the second week is not as valuable as the first (Figure 4). For example, for steers with a starting weight of 525 pounds the first week, February 25 to March 4, is worth $4 per acre. However, the second week, March 4 to March 11, adds only $3 per acre. Thus, the estimated value of grazing a 525 pound steer two extra weeks from February 25 to March 11 is $7 per acre. A steer with a purchase weight of 525 pounds will weigh different amounts depending on the supplementation strategy that is followed as well as the selling date. If a 525 pound steer is fed a high-calcium mineral supplement, the steer will weigh 772 pounds on February 25, 788 pounds on March 4, and 804 pounds on March 11. If this same 525 pound steer is supplemented with OKGG (R1620), it will weigh 816 pounds (796 pounds) on February 25, 834 pounds (813 pounds) on March 4, and 853 pounds (831 pounds) on March 11. The returns generated from the various supplementation and selling strategies are reflected in the selling price of the stocker, which depends on the weight of the stocker at sale time.

The main findings are that lighter stockers fed monensin and sold at a later date generate more income per acre. By purchasing light weight stockers, the producer lowers the initial purchase value of the stocker and can increase the number of animals stocked. Furthermore, by feeding monensin, the average daily gain increases; and by selling at the later sell date, the stockers are heavier and more valuable. However, as a result of the seasonal price patterns, the value of the additional weeks of grazing is influenced by starting weight.

Summary

The first objective was to determine the expected value of two monensin supplementation strategies for steers and heifers pastured on fall/winter wheat pasture with alternative beginning weights, relative to the value of a free-choice mineral supplement (containing no monensin). It was determined that for every gender and weight combination, the estimated net return from feeding monensin as R1620 exceeds the estimated net return from feeding OKGG. The expected net return from feeding R1620 above the expected net return from feeding a free-choice mineral supplement, ranged from $11.23 per head ($8.20 per acre) for steers with a beginning weight of 375 pounds to $19.40 per head ($10.09 per acre) for heifers with a beginning weight of 525 pounds for a March 11 sale date. The answer to the first research question is that the R1620 monensin supplement is more economical than the OKGG supplement. The estimated net return from feeding R1620 is $9 to $13 more per acre than that obtained from a free-choice mineral supplement.

The second objective was to determine the expected value of extending the fall/winter wheat pasture grazing season by either one or two weeks. In general, the value in dollars per acre of one additional week of grazing from February 25 to March 4 is less for steers than for heifers. It ranges from $3 per acre for steers with a beginning weight of 575 pounds to $10 per acre for heifers with a beginning weight of 375 pounds. On average, extension of the grazing season adds value to the stocker enterprise.

The value in dollars per acre of two additional weeks of grazing after February 25 is less for steers than for heifers, and the second week is not as valuable as the first. It ranges from $6 per acre for steers with a beginning weight of 575 pounds to $16 per acre for heifers with a beginning weight of 375 pounds. For steers with a starting weight of 525 pounds the first week February 25 to March 4 is worth $4 per acre. However, the second week, March 4 to March 11 adds only $3 per acre. If the additional two weeks of grazing reduced wheat grain yield by three bushels and if the net value of wheat is $3 per bushel, the cost of additional grazing in lost grain value would exceed the benefits. These findings suggest that the dual-purpose wheat variety development program should not sacrifice much wheat grain to obtain one or two additional weeks of pre-first hollow stem grazing. The average Oklahoma wheat grain yield per harvested acre from 2001 to 2006 was 31.8 bushels. For most situations, with $3 per bushel wheat, a wheat variety that increased wheat grain yield by 10 percent would be more valuable than a variety that enables extension of the fall/winter grazing season by two weeks.

Further research is needed to address several limitations of the study. First, feeding a supplement containing monensin has reduced the incidence of bloat, which decreases death loss. However, data are not available to precisely estimate the effect of monensin on death loss due to bloat. Second, more research is necessary to more precisely determine the wheat grain yield consequences of delaying the onset of first hollow stem stage.

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Figure 1. Seasonal steer price chart denoting the steer prices at the critical first hollow stem stage of wheat plant growth (mid-February to mid-March)

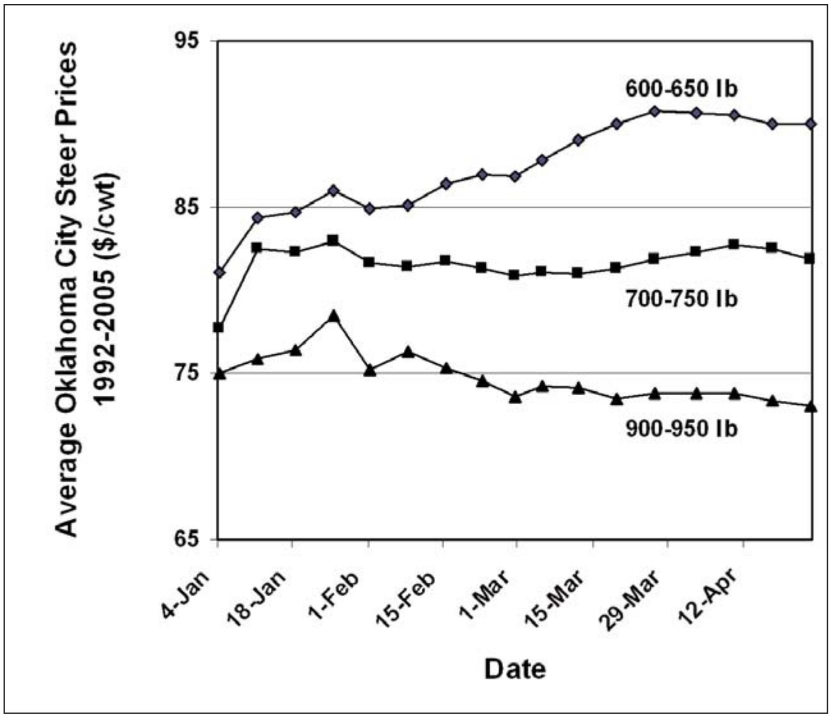

Figure 2. Flow chart of stocker purchase, supplementation, and liquidation strategy, alternatives and assumptions

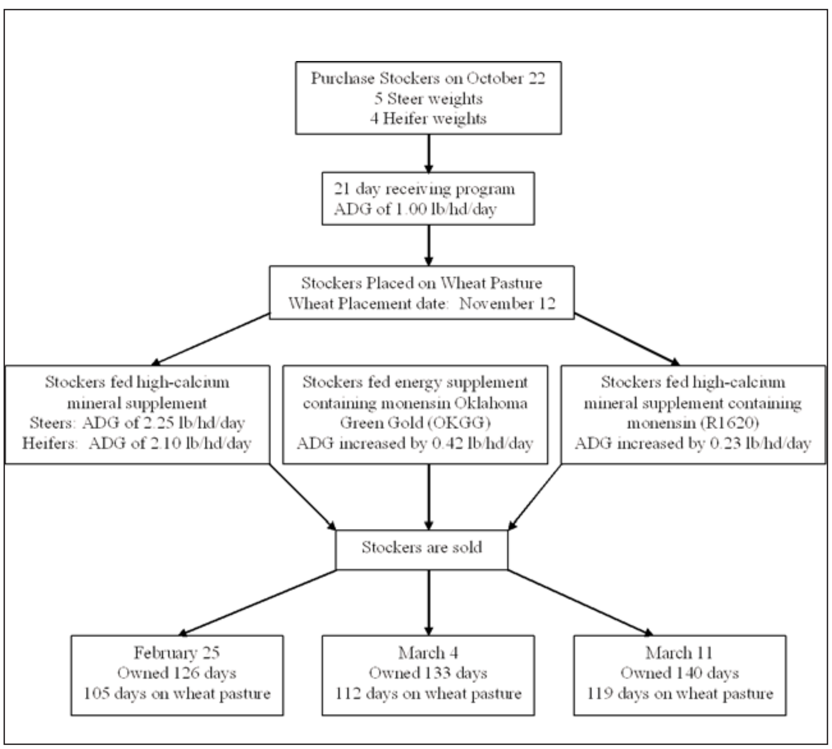

Figure 3. Net return to land, labor, management, and overhead ($ per head) from feeding supplements (OKGG and R1620) containing Monensin, relative to feeding a high-calcium mineral supplement, for Steers (S) and Heifers (H) stocked on Fall/Winter wheat pasture with alternative beginning (October 22) weights and a sale date of March 11

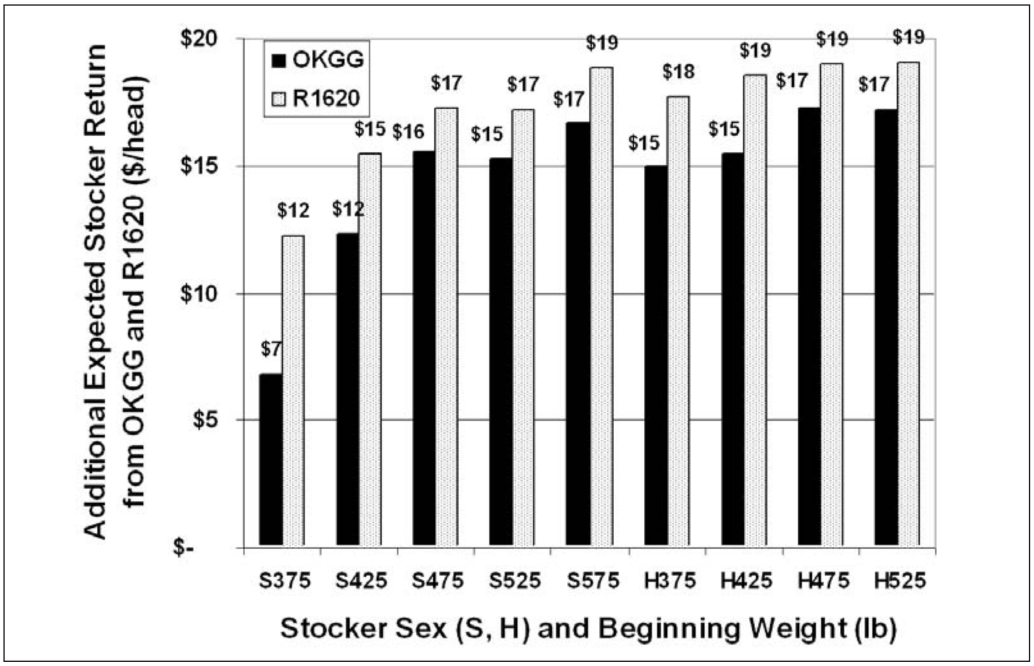

Figure 4. Net return to land, labor, management, and overhead ($ per acre) from grazing wheat for one and for two weeks after February 25, for Stocker Steers (S) and Heifers (H) supplemented with R1620 with alternative beginning (October 22) weights assuming that wheat grain yields are unaffected

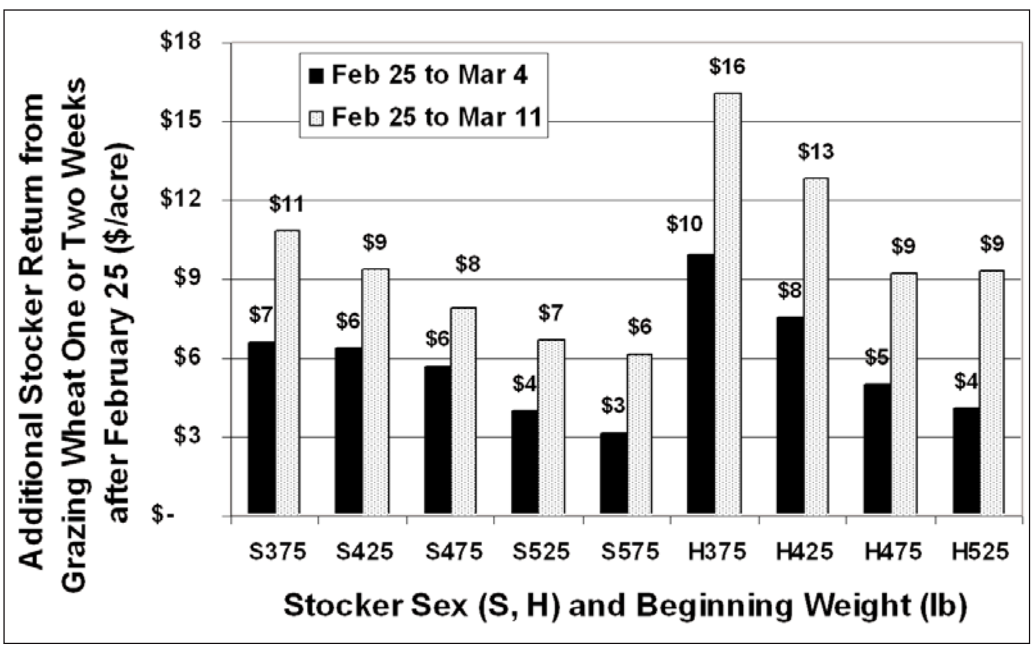

Table 1. Production assumptions for stocking density, average daily gain, death loss and veterinary medicine expenses for each beginning weight and stocker gender alternative modeled

Stocker Gender and Beginning Weight (lb)	Stocking Density (hd/ac)[a]	Gain with High-calcium Mineral Supplement (no monensin) (lb/day)	Gain with OKGG (lb/day)	Gain with R1620 (lb/day)	Death Loss (%)	Vet -Med Cost ($/hd)
Steers 375	0.73	2.25	2.67	2.48	2.00	20.0
Steers 425	0.65	2.25	2.67	2.48	1.75	17.5
Steers 475	0.58	2.25	2.67	2.48	1.50	15.0
Steers 525	0.52	2.25	2.67	2.48	1.25	12.5
Steers 575	0.48	2.25	2.67	2.48	1.00	10.0
Heifers 375	0.73	2.10	2.52	2.33	2.50	24.0
Heifers 425	0.65	2.10	2.52	2.33	2.25	21.5
Heifers 475	0.58	2.10	2.52	2.33	2.00	19.0
Heifers 525	0.52	2.10	2.52	2.33	1.75	16.5

[a] Stocking density is based on one 550 pound animal per two acres (275 pounds per acre).

Table 2. Base enterprise budget for steers with a beginning weight of 375 pounds sold on March 11 for each of the supplementation strategies (high-calcium mineral, OKGG, and R1620).[a]

Assumed Death Loss	%	2%	2%	2%
Days on Wheat	days	119	119	119
Days owned	days	140	140	140
ADG	lb/hd/day	2.25	2.67	2.48
Purchase Weight	cwt/hd	3.75	3.75	3.75
Average Purchase Price from 1992-2005	$/cwt	108.34	108.34	108.34
Selling Weight	cwt/hd	6.50	6.99	6.77
Average Selling Price from 1993-2006	$/cwt	88.50	84.50	86.20
Stocking Density	hd/ac	0.73	0.73	0.73

Item	Unit	Price	Quantity	Value with High-calcium Mineral Supplement	Value with OKGG Supplement	Value with R1620 Supplement
Gross receipts:						
Steers (based on death loss of 2%)	cwt	$89.43	Selling weight	$575.67	$591.04	$583.83
Operating costs:						
Stocker calves	cwt	$108.34	3.75	$406.28	$406.28	$406.28
Order buyer fee	cwt	$0.50	3.75	$1.88	$1.88	$1.88
Shipping to pasture[b]	$/hd	$10.00	1	$10.00	$10.00	$10.00
Receiving program (21 days):						
Veterinary and medicine	$/hd	$20.00	1	$20.00	$20.00	$20.00
Hay (2% of initial purchase weight in lb/hd/day)[c]	lb	$0.03	157.5	$4.73	$4.73	$4.73
Soybean meal based supplement (2 lb/hd/day)[d]	lb	$0.09	42	$3.62	$3.62	$3.62
Other:						
Shipping to market, sales commission, etc.[e]	cwt	$2.00	Selling weight	$13.01	$13.99	$13.55
Machinery fuel, lube, and repairs[f]	$	$10.00	1	$10.00	$10.00	$10.00
Hay during bad weather (assume 2 bad days)	lb	$0.03	24	$0.72	$0.72	$0.72
High-calcium mineral mixture[g]	lb	$0.19	53.55	$10.17	$0.00	$0.00
Monensin supplement - OKGG[h]	lb	$0.08	2	$0.00	$17.85	$0.00
Monensin supplement - R1620[i]	lb	$0.29	0.15	$0.00	$0.00	$5.18
Interest on Stocker calves	$	$0.0625	155.83	$9.74	$9.74	$9.74
Interest on other operating expenses	$	$0.0625	Operating Exp.	$1.78	$1.98	$1.67
Total operating costs	**$/head**			$491.92	$500.78	$487.35

Table 2. Cont'd.

Item	Unit	Price	Quantity	Value with High-calcium Mineral Supplement	Value with OKGG Supplement	Value with R1620 Supplement
Fixed costs for steer production:						
Machinery and equipment – Depr., taxes and insurance	$	$5.50	1	$5.50	$5.50	$5.50
Machinery and equipment – Interest	$	$0.0625	2.11	$0.13	$0.13	$0.13
Total fixed costs, $/head				$5.63	$5.63	$5.63
Total costs, $/head				$497.55	$506.41	$492.98
Net return to land, labor, overhead, and management	**$/head**			$78.12	$84.63	$90.85
Net return to land, labor, overhead, and management	**$/acre**			$57.29	$62.06	$66.62

[a] This budget was adapted from Kaitibie et al. The base budget for heifers is similar. Weights for heifers are adjusted to reflect differences in daily gain and death loss (Table 1). Steer and heifer purchase and selling prices were based upon Oklahoma City prices. A separate budget was computed for each production strategy for each year for which prices were available.

[b] Shipping to pasture is based on $3/loaded mile. $10 is used as a base price.
[c] Hay price is based on premium large round bales of grass hay in Central & Eastern Oklahoma of $60/ton. Source: www.ams.usda.gov/mnreports/OK_GR310.txt
[d] Soybean meal is based on $172.50/ton. Consistent with prices reported at http://www.ams.usda.gov/LSMNpubs/pdf_weekly/dc_grain.pdf.
[e] Shipping to market is based on $2/cwt.
[f] Machinery costs for lube and repairs is assumed to be $10/hd.
[g] High-calcium mineral mixture is based on $380/ton. Source: Animal Science Department at Oklahoma State University
[h] OKGG monensin supplement is based on $150/ton.
[i] R1620 monensin supplement is based on $580/ton.

Table 3. Estimated net returns to land, labor, overhead, and management from steers and heifers stocked on dual-purpose winter wheat pasture for three supplement strategies with alternative beginning weights and a March 11 selling date

Stocker Gender and Beginning Weight (lb)	High-calcium Mineral Supplement ($/acre)	OKGG Supplement[a] ($/acre)	R1620 Supplement[a] ($/acre)	Added Value of OKGG ($/acre)	Added Value of R1620 ($/acre)
Steers 375	57	62	66	5	9
Steers 425	38	46	48	8	10
Steers 475	35	44	45	9	10
Steers 525	33	41	42	8	9
Steers 575	30	38	39	8	9
Heifers 375	56	67	69	11	13
Heifers 425	45	55	57	10	12
Heifers 475	39	49	50	10	11
Heifers 525 [b]	30	39	40	9	10

[a] OKGG is a hand-fed energy supplement containing monensin. R1620 is a free-choice fed high-calcium mineral supplement containing monensin.

[b] Prices for heifers with a purchase weight of 525 pounds were only available for 2000-2006. All other prices are from 1992-2006. Net returns were computed for each strategy for each of the 14 years. Averages of the 14 values are reported.

Table 4. Estimated gross return per trip to hand feeding OKGG, relative to a self-fed high-calcium mineral supplement (with a March 11 sale date)

Size of Pasture (ac)	Gross Return Per Trip ($)								
	Steer 375	Steer 425	Steer 475	Steer 525	Steer 575	Heifer 375	Heifer 425	Heifer 475	Heifer 525
	Stocking density hd/ac								
	0.73	0.65	0.58	0.52	0.48	0.73	0.65	0.58	0.52
40	3	5	6	5	5	7	7	6	6
80	7	11	12	11	10	15	13	13	6
160	13	22	23	21	20	29	26	25	25
320	27	43	47	42	40	59	52	51	50

It is assumed that the quantity of supplement required for a pasture could be delivered in a single trip. The cost per trip would be farm specific and would depend upon the distance from the farmstead to the field and the opportunity cost of labor.

Table 5. Estimated net returns from keeping stockers on wheat pasture one or two additional weeks after February 25 for stockers supplemented with R1620

Stocker Gender and Beginning Weight (lb)	Selling on Feb. 25 ($/ac)	Selling on Mar. 4 ($/ac)	Selling on Mar. 11 ($/ac)	Return from Grazing one week from Feb 25 to Mar 4 ($/ac)	Return from Grazing two weeks from Feb 25 to Mar 11 ($/ac)	Value of Grazing one week from Feb 25 to Mar 4 (bu/ac)[a]	Value of Grazing two weeks from Feb 25 to Mar 11 (bu/ac)[a]
Steers 375	54.84	61.45	65.67	6.61	10.83	2.2	3.6
Steers 425	38.45	44.84	47.81	6.39	9.36	2.1	3.1
Steers 475	37.46	43.18	45.36	5.72	7.90	1.9	2.6
Steers 525	35.61	39.58	42.31	3.97	6.70	1.3	2.2
Steers 575	32.73	35.91	38.89	3.18	6.16	1.1	2.1
Heifers 375	53.01	62.95	69.06	9.94	16.05	3.3	5.4
Heifers 425	44.09	51.61	56.93	7.52	12.84	2.5	4.3
Heifers 475	40.63	45.62	49.89	4.99	9.26	1.7	3.1
Heifers 525	30.34	34.42	39.66	4.08	9.32	1.4	3.1

[a] A wheat price of $3/bushel is assumed. The average Oklahoma wheat grain yield per harvested acre from 2001 to 2006 was 31.8 bushels.