Evaluation of Pasture Forage and Harvested Forage Types during the Fall Lactation Production Period

Results

The fall lactation production period was 30 days from mid October until mid November. The fall lactation production period has nutritional requirements above maintenance. The greater part of the additional nutrients is for the production of milk for the nursing calf, and a smaller amount is for fetus development. The nutritional quality of the forage affects the quantities of milk produced. If forage quality is at or near animal nutritional requirements, milk production can be fairly high and rate of calf weight gain can be satisfactory (BCRC 1999). Forage quality of mature perennial grasses on traditionally managed pastures is below the requirements of a lactating cow. Forage-feed costs increase when the nutrient quality of the grass or forage provided does not meet the nutritional requirements of the cow. Cows lose body weight and body condition when body reserves are converted into milk production. The level of milk production and the rate of calf weight gain are low; the result is higher costs per pound of calf weight gained. Pasture forage and harvested forage costs and returns after feed costs were determined for a 1200-pound range cow with a calf during the fall lactation production period. A grazing cow with a calf requires an allocation of 30 lbs of pasture forage dry matter per day. The cow requires a daily intake of 27 lbs dry matter (DM) at 9.3% crude protein (CP) (2.51 lbs CP/day).

The costs of grazing native rangeland during the fall are considerably higher than the costs of grazing native rangeland during the summer. The weight of the herbage on fall pastures is only about 40% to 60% of the mid summer herbage weight on grasslands that have had no grazing all growing season. Native rangeland pasture forage during the fall has a crude protein content of around 4.8%, about half the content of mid summer herbage.

Pasture Forage Types

Native rangeland managed as a repeated seasonal pasture was evaluated during the fall lactation production period for 30 days between mid October and mid November (tables 48 and 53). Native rangeland forage during the fall has a crude protein content of around 4.8%. Fall native rangeland forage had pasture rent value or production costs of $8.76 per acre, forage dry matter costs of $88.85 per ton, and crude protein costs of $0.92 per pound. A cow grazing during the fall lactation period required 4.60 acres at a forage cost of $40.30 per production period. The crude protein content of mature native rangeland forage is below the requirements of a lactating cow during the fall, and crude protein would need to be supplemented at 1.21 lbs per cow per day at a cost of $10.90 per period. Total forage feed costs were $51.20 per period, or $1.71 per day (table 54). Calf weight gain was 1.80 lbs per day and 11.83 lbs per acre; accumulated weight gain was 54.00 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $37.80 per calf, and the net returns after pasture costs were a loss of $13.40 per cow-calf pair and a loss of $2.91 per acre. The cost of calf weight gain was $0.95 per pound (table 55).

Native rangeland managed as a 6.0-month seasonlong pasture was evaluated during the fall lactation production period for 30 days between mid October and mid November (tables 48 and 53). Native rangeland forage had pasture rent value or production costs of $8.76 per acre and forage dry matter costs of $78.57 per ton. The stocking rate used during the summer lactation period was not adjusted to match the reduction in fall herbage biomass on this traditional grazing treatment. A cow grazing during the fall lactation period was allotted 4.04 acres at a forage cost of $35.39 per production period. Additional roughage or crude protein were not supplemented on this pasture forage type. Total forage feed costs were $35.29 per period, or $1.18 per day (table 54). Cows lost 1.74 lbs per day and lost 12.90 lbs per acre; accumulated weight loss was 52.20 lbs. Calf weight gain was 0.59 lbs per day and 4.38 lbs per acre; accumulated weight gain was 17.73 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $12.41 per calf, and the net returns after pasture costs were a loss of $22.98 per cow-calf pair and a loss of $5.69 per acre. The cost of calf weight gain was $1.99 per pound (table 55).

Native rangeland managed as a 5.5-month seasonlong pasture was evaluated during the fall lactation production period for 30 days between mid October and mid November (tables 48 and 53). Native rangeland forage had pasture rent value or production costs of $8.76 per acre and forage dry matter costs of $49.21 per ton. The stocking rate used during the summer lactation period was not adjusted to match the reduction in fall herbage biomass on this traditional grazing treatment. A cow grazing during the fall lactation period was allotted 2.53 acres at a forage cost of $22.16 per production period. Additional roughage or crude protein were not supplemented on this pasture forage type. Total forage feed costs were $22.16 per period, or $0.74 per day (table 54). Cows lost 0.82 lbs per day and lost 9.77 lbs per acre; accumulated weight loss was 24.60 lbs. Calf weight gain was 0.92 lbs per day and 10.90 lbs per acre; accumulated weight gain was 27.60 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $19.32 per calf, and the net returns after pasture costs were a loss of $2.84 per cow-calf pair and a loss of $1.12 per acre. The cost of calf weight gain was $0.80 per pound (table 55).

Native rangeland managed as a deferred grazing pasture was evaluated during the fall lactation production period for 30 days between mid October and mid November (tables 48 and 53). Native rangeland forage had pasture rent value or production costs of $8.76 per acre and forage dry matter costs of $42.52 per ton. The high stocking rate used during the summer lactation period was not adjusted to match the reduction in fall herbage biomass on this traditional grazing treatment. A cow grazing during the fall lactation period was allotted 2.18 acres (2.22 acres per month) at a forage cost of $19.53 per production period. Additional roughage or crude protein were not supplemented on this pasture forage type. Total forage feed costs were $19.53 per period, or $0.65 per day (table 54). Cows lost 0.74 lbs per day and lost 9.96 lbs per acre; accumulated weight loss was 22.20 lbs. Calf weight gain was 0.77 lbs per day and 10.36 lbs per acre; accumulated weight gain was 23.10 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $16.17 per calf, and the net returns after pasture costs were a loss of $3.36 per cow-calf pair and a loss of $1.51 per acre. The cost of calf weight gain was $0.85 per pound (table 55).

Native rangeland managed as a 4.5-month seasonlong pasture started in mid June was evaluated during the fall lactation production period for 15 days between mid October to late October (tables 48 and 53). Native rangeland forage had pasture rent value or production costs of $8.76 per acre and forage dry matter costs of $72.10 per ton. The stocking rate used during the summer lactation period was not adjusted to match the reduction in fall herbage biomass on this traditional grazing treatment. A cow grazing during the fall lactation period was allotted 1.63 acres (3.26 acres per month) at a forage cost of $14.28 for 15 days. Additional roughage or crude protein were not supplemented on this pasture forage type. Total forage feed costs were $14.28 per period, or $0.95 per day (table 54). Cows lost 0.52 lbs per day and lost 4.75 lbs per acre; accumulated weight loss was 7.74 lbs in 15 days. Calf weight gain was 1.35 lbs per day and 6.71 lbs per acre; accumulated weight gain was 20.33 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $14.23 per calf, and the net returns after pasture costs were a loss of $0.05 per cow-calf pair and a loss of $0.03 per acre. The cost of calf weight gain was $0.70 per pound (table 55).

Altai wildrye seeded domesticated grassland managed as a complementary fall pasture was evaluated during the fall lactation production period for 30 days between mid October and mid November (tables 49 and 53). Altai wildrye grassland forage had pasture rent value or production costs of $8.76 per acre and forage dry matter costs of $27.04 per ton. A cow grazing during the fall lactation period was allotted 1.39 acres at a forage cost of $12.18 per production period. Additional roughage or crude protein were not supplemented on this pasture forage type. Total forage feed costs were $12.18 per period, or $0.40 per day (table 54). Cow weight gain was 0.55 lbs per day and 11.87 lbs per acre; accumulated weight gain was 16.50 lbs. Calf weight gain was 1.73 lbs per day and 37.96 lbs per acre; accumulated weight gain was 52.77 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $36.94 per calf, and the net returns after pasture costs were $24.76 per cow-calf pair and $17.81 per acre. The cost of calf weight gain was $0.23 per pound (table 55).

Cropland aftermath of annual cereal stubble managed as a seasonal pasture was evaluated during the fall lactation production period for 30 days between mid October and mid November (tables 49 and 53). Cropland aftermath forage had pasture rent value or production costs of $2.00 per acre and forage dry matter costs of $29.63 per ton. A cow grazing cropland aftermath pasture would require 6.63 acres and the forage would cost $13.26 per production period. Additional crude protein was not supplemented even though the forage was below the requirements of a cow during fall lactation. Total forage feed costs were $13.26 per period, or $0.44 per day (table 54). Lactating cows lost 1.61 lbs per day and lost 7.27 lbs per acre; accumulated weight loss was 48.17 lbs. Calf weight gain was 0.42 lbs per day and 1.90 lbs per acre; accumulated weight gain was 12.57 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $8.80 per calf, and the net returns after pasture costs were a loss of $4.46 per cow-calf pair and a loss of $0.67 per acre. The cost of calf weight gain was $1.05 per pound (table 55).

Spring seeded winter cereal (winter rye) managed as a seasonal pasture was evaluated during the fall lactation production period for 30 days between mid October and mid November (tables 49 and 53). Spring seeded winter cereal forage had production costs of $41.75 per acre and forage dry matter costs of $43.77 per ton. A cow grazing during the fall lactation period was allotted 0.47 acres at a forage cost of $19.70 per production period. Additional roughage or crude protein were not supplemented on this pasture forage type. Total forage feed costs were $19.70 per period, or $0.66 per day (table 54). Cow weight gain was 1.05 lbs per day and 67.02 lbs per acre; accumulated weight gain was 31.50 lbs. Calf weight gain was assumed to be 2.00 lbs per day; accumulated weight gain was 60.0 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $42.00 per calf, and the net returns after pasture costs were $22.30 per cow-calf pair and $47.45 per acre. The cost of calf weight gain was $0.33 per pound (table 55).

Harvested Forage Types

Crested wheatgrass hay cut late, at a mature plant stage, has a crude protein content of 6.4%. This crested wheatgrass hay has production costs of $28.11 per acre, forage dry matter costs of $34.80 per ton, and crude protein costs of $0.28 per pound. Mature crested wheatgrass hay would be fed at 30.0 lbs DM/day to provide 1.9 lbs CP/day. An additional 0.59 lbs of crude protein per day would need to be provided, at a cost of $5.31 per period. Production of mature crested wheatgrass hay to feed during the fall lactation period (tables 50 and 53) would require 0.56 acres, and the forage would cost $15.84 per period. Total forage and supplement costs would be $21.15 per period, or $0.71 per day (table 54). Calf weight gain was assumed to be 2.00 lbs per day; accumulated weight gain was 60.0 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $42.00 per calf, and the net returns after feed costs were $20.85 per cow-calf pair and $37.07 per acre. The cost of calf weight gain was $0.35 per pound (table 55).

Crested wheatgrass hay cut early, at the boot stage, has a crude protein content of 14.5%. This crested wheatgrass hay has production costs of $26.50 per acre, forage dry matter costs of $40.80 per ton, and crude protein costs of $0.14 per pound. Early cut crested wheatgrass hay would be fed at 17.3 lbs DM/day to provide 2.5 lbs CP/day. An additional 12.7 lbs of roughage per day would need to be provided, at a cost of $6.66 per period. Production of early cut crested wheatgrass hay to feed during the fall lactation period (tables 50 and 53) would require 0.40 acres, and the forage would cost $10.50 per period. Total forage and supplement costs would be $17.16 per period, or $0.57 per day (table 54). Calf weight gain was assumed to be 2.00 lbs per day; accumulated weight gain was 60.0 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $42.00 per calf, and the net returns after feed costs were $24.84 per cow-calf pair and $62.10 per acre. The cost of calf weight gain was $0.29 per pound (table 55).

Forage barley hay cut early, at the milk stage, has a crude protein content of 13.0%. This forage barley hay has production costs of $68.21 per acre, forage dry matter costs of $28.80 per ton, and crude protein costs of $0.11 per pound. Early cut forage barley hay would be fed at 19.3 lbs DM/day to provide 2.5 lbs CP/day. An additional 10.7 lbs of roughage per day would need to be provided, at a cost of $5.62 per period. Production of early cut forage barley hay to feed during the fall lactation period (tables 51 and 53) would require 0.12 acres, and the forage would cost $8.40 per period. Total forage and supplement costs would be $14.02 per period, or $0.47 per day (table 54). Calf weight gain was assumed to be 2.00 lbs per day; accumulated weight gain was 60.0 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $42.00 per calf, and the net returns after feed costs were $27.98 per cow-calf pair and $233.17 per acre. The cost of calf weight gain was $0.23 per pound (table 55).

Forage barley hay cut late, at the hard dough stage, has a crude protein content of 9.2%. This forage barley hay has production costs of $70.35 per acre, forage dry matter costs of $27.40 per ton, and crude protein costs of $0.15 per pound. Late-cut forage barley hay would be fed at 27.3 lbs DM/day to provide 2.5 lbs CP/day. An additional 2.7 lbs of roughage per day would need to be provided, at a cost of $1.42 per period. Production of late-cut forage barley hay to feed during the fall lactation period (tables 51 and 53) would require 0.16 acres, and the forage would cost $11.40 per period. Total forage and supplement costs would be $12.82 per period, or $0.43 per day (table 54). Calf weight gain was assumed to be 2.00 lbs per day; accumulated weight gain was 60.0 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $42.00 per calf, and the net returns after feed costs were $29.18 per cow-calf pair and $182.38 per acre. The cost of calf weight gain was $0.21 per pound (table 55).

Oat forage hay cut early, at the milk stage, has a crude protein content of 11.5%. This oat forage hay has production costs of $69.17 per acre, forage dry matter costs of $29.60 per ton, and crude protein costs of $0.13

per pound. Early cut oat hay would be fed at 21.8 lbs DM/day to provide 2.5 lbs CP/day. An additional 8.2 lbs of roughage per day would need to be provided, at a cost of $4.31 per period. Production of early cut oat hay to feed during the fall lactation period (tables 51 and 53) would require 0.14 acres, and the forage would cost $9.90 per period. Total forage and supplement costs would be $14.21 per period, or $0.47 per day (table 54). Calf weight gain was assumed to be 2.00 lbs per day; accumulated weight gain was 60.0 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $42.00 per calf, and the net returns after feed costs were $27.79 per cow-calf pair and $198.50 per acre. The cost of calf weight gain was $0.24 per pound (table 55).

Oat forage hay cut late, at the hard dough stage, has a crude protein content of 7.8%. This oat forage hay has production costs of $74.53 per acre, forage dry matter costs of $26.40 per ton, and crude protein costs of $0.17 per pound. Late-cut oat hay would be fed at 30.0 lbs DM/day to provide 2.34 lbs CP/day. An additional 0.17 lbs of crude protein per day would need to be provided, at a cost of $1.53 per period. Production of late-cut oat hay to feed during the fall lactation period (tables 51 and 53) would require 0.16 acres, and the forage would cost $11.88 per period. Total forage and supplement costs would be $13.41 per period, or $0.45 per day (table 54). Calf weight gain was assumed to be 2.00 lbs per day; accumulated weight gain was 60.0 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $42.00 per calf, and the net returns after feed costs were $28.59 per cow-calf pair and $178.69 per acre. The cost of calf weight gain was $0.22 per pound (table 55).

Pea forage hay cut at an early plant stage has a crude protein content of 18.9%. This pea forage hay has production costs of $79.96 per acre, forage dry matter costs of $55.00 per ton, and crude protein costs of $0.15 per pound. Early cut pea forage hay would be fed at 13.3 lbs DM/day to provide 2.5 lbs CP/day. An additional 16.7 lbs of roughage per day would need to be provided, at a cost of $8.79 per period. Production of early cut pea forage hay to feed during the fall lactation period (tables 52 and 53) would require 0.14 acres, and the forage would cost $11.40 per period. Total forage and supplement costs would be $20.19 per period, or $0.67 per day (table 54). Calf weight gain was assumed to be 2.00 lbs per day; accumulated weight gain was 60.0 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $42.00 per calf, and the net returns after feed costs were $21.81 per cow-calf pair and $155.78 per acre. The cost of calf weight gain was $0.34 per pound (table 55).

Pea forage hay cut at a late plant stage has a crude protein content of 14.4%. This pea forage hay has production costs of $86.87 per acre, forage dry matter costs of $37.40 per ton, and crude protein costs of $0.13 per pound. Late-cut pea forage hay would be fed at 17.4 lbs DM/day to provide 2.5 lbs CP/day. An additional 12.6 lbs of roughage per day would need to be provided, at a cost of $6.62 per period. Production of late-cut pea forage hay to feed during the fall lactation period (tables 52 and 53) would require 0.11 acres, and the forage would cost $9.90 per period. Total forage and supplement costs would be $16.52 per period, or $0.55 per day (table 54). Calf weight gain was assumed to be 2.00 lbs per day; accumulated weight gain was 60.0 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $42.00 per calf, and the net returns after feed costs were $25.48 per cow-calf pair and $231.64 per acre. The cost of calf weight gain was $0.28 per pound (table 55).

Forage lentil hay cut at an early plant stage has a crude protein content of 21.8%. This forage lentil hay has production costs of $59.69 per acre, forage dry matter costs of $71.60 per ton, and crude protein costs of $0.17 per pound. Early cut lentil hay would be fed at 11.5 lbs DM/day to provide 2.5 lbs CP/day. An additional 18.5 lbs of roughage per day would need to be provided, at a cost of $9.71 per period. Production of early cut forage lentil hay to feed during the fall lactation period (tables 52 and 53) would require 0.21 acres, and the forage would cost $12.90 per period. Total forage and supplement costs would be $22.61 per period, or $0.75 per day (table 54). Calf weight gain was assumed to be 2.00 lbs per day; accumulated weight gain was 60.0 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $42.00 per calf, and the net returns after feed costs were $19.39 per cow-calf pair and $92.33 per acre. The cost of calf weight gain was $0.38 per pound (table 55).

Forage lentil hay cut at a late plant stage has a crude protein content of 14.7%. This forage lentil hay has production costs of $71.48 per acre, forage dry matter costs of $37.00 per ton, and crude protein costs of $0.13 per pound. Late-cut forage lentil hay would be fed at 17.1 lbs DM/day to provide 2.5 lbs CP/day. An additional 12.9 lbs of roughage per day would need to be provided, at a cost of $6.77 per period. Production of late-cut forage lentil hay to feed during the fall lactation period (tables 52 and 53) would require 0.13 acres, and the forage would cost $9.90 per period. Total forage and supplement costs would be $16.67 per period, or $0.56 per day (table 54). Calf weight gain was assumed to be 2.00 lbs per day; accumulated weight gain was 60.0 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $42.00 per calf, and the net returns after feed costs were $25.33 per cow-calf pair and $194.85 per acre. The cost of calf weight gain was $0.28 per pound (table 55).

Oat-pea forage hay has a crude protein content of 12.5%. This oat-pea forage hay has production costs of $95.52 per acre, forage dry matter costs of $37.20 per ton, and crude protein costs of $0.16 per pound. Oat-pea forage hay would be fed at 20.1 lbs DM/day to provide 2.5 lbs CP/day. An additional 9.9 lbs of roughage per day would need to be provided, at a cost of $5.20 per period. Production of oat-pea forage hay to feed during the fall lactation period (tables 52 and 53) would require 0.12 acres, and the forage would cost $11.40 per period. Total forage and supplement costs would be $16.60 per period, or $0.55 per day (table 54). Calf weight gain was assumed to be 2.00 lbs per day; accumulated weight gain was 60.0 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $42.00 per calf, and the net returns after feed costs were $25.40 per cow-calf pair and $211.67 per acre. The cost of calf weight gain was $0.28 per pound (table 55).

Discussion

Pasture Forage Types

Native rangeland forage grazed as a repeated seasonal pasture during the fall lactation production period was high-cost forage because the quantities of crude protein captured per acre were low and the quantity of forage dry matter available per acre was low. Total forage costs for native rangeland grazed as a repeated seasonal pasture was high, even though the equipment costs, labor costs, land rent per acre, and forage production costs per acre were low, because the input costs did not directly regulate livestock forage feed costs. The cost per pound of crude protein ($0.92/lb CP) was very high because of the low quantity of crude protein weight contained in the forage. The crude protein content of the forage was below the requirements of a lactating cow making it necessary to provide purchased supplemental crude protein. The forage dry matter cost ($88.85/ton) was very high because of the low quantity of forage dry matter production. The low forage weight per acre made it necessary to use about two times the land area that would have been needed during the summer period to provide a cow with adequate forage dry matter for a month in the same pasture. The large land area (4.60 acres) per cow caused the forage costs per period to be high. The total daily forage and supplemental crude protein costs ($1.71/day) were extremely high. The total feed costs were greater than the low market value of the accumulated calf weight causing a high loss in returns after feed costs ($-13.40) per cow and a moderate loss in returns after feed costs ($-2.91) per acre. The cost per pound of calf weight gain ($0.95/lb) was very high because of the low crude protein and low forage dry matter yields per acre and the large land area per cow-calf pair.

Native rangeland forage grazed as a 6.0-month seasonlong pasture during the fall lactation production period was very high-cost forage because the quantity of forage dry matter available per acre was very low and the crude protein content of the forage was low. Total forage costs for native rangeland grazed as a 6.0-month seasonlong pasture was very high, even though the equipment costs, labor costs, land rent per acre, and forage production costs per acre were very low, because the input costs did not directly regulate livestock forage feed costs. The forage dry matter cost ($78.57/ton) was very high because the quantity of forage weight per acre was low. The low forage availability per acre and the low crude protein content in the forage were major causes for the low cow and calf weight performance per acre. The large land area (4.04 acres/month) per cow caused the forage costs per period to be high. The total daily forage feed costs ($1.18/day) were very high. The total feed costs were greater than the low market value of the accumulated calf weight causing a high loss in returns after feed costs ($-22.98) per cow and a moderate loss in returns after feed costs ($-5.69) per acre. The cost per pound of calf weight gain ($1.99/lb) was extremely high because of the low forage dry matter yield per acre, the low crude protein content in the forage, the low animal weight performance per acre, and the large land area per cow-calf pair.

Native rangeland forage grazed as a 5.5-month seasonlong pasture during the fall lactation production period was high-cost forage because the quantity of forage dry matter available per acre was moderate and the crude protein content of the forage was low. Total forage costs for native rangeland grazed as a 5.5-month seasonlong pasture was high, even though the equipment costs, labor costs, land rent per acre, and forage production costs per acre were very low, because the input costs did not directly regulate livestock forage feed costs. The forage dry matter cost ($49.21/ton) was high because the quantity of forage weight per acre was moderate. The moderate forage availability per acre and the low crude protein content in the forage were major causes for the low cow and calf weight performance per acre. The moderate land area (2.53 acres/month) per cow caused the forage costs per period to be high. The total daily forage feed costs ($0.74/day) were high. The total feed costs were greater than the low market value of the accumulated calf weight causing a moderate loss in returns after feed costs ($-2.84) per cow and a moderate loss in returns after feed costs ($-1.12) per acre. The cost per pound of calf weight gain ($0.80/lb) was high because of the moderate forage dry matter yield per acre, the low crude protein content in the forage, the low animal weight performance per acre, and the large land area per cow-calf pair.

Native rangeland forage grazed as a deferred pasture during the fall lactation production period was high-cost forage because the quantity of forage dry matter available per acre was moderate and the crude protein content of the forage was low. Total forage costs for native rangeland grazed as a deferred pasture was high, even though the equipment costs, labor costs, land rent per acre, and forage production costs per acre were very low, because the input costs did not directly regulate livestock forage feed costs. The forage dry matter cost ($42.52/ton) was high because the quantity of forage weight per acre was moderate. The moderate forage availability per acre and the low crude protein content in the forage were major causes for the low cow and calf weight performance per acre. The moderate land area (2.22 acres/month) per cow caused the forage costs per period to be high. The total daily forage feed costs ($0.65/day) were high. The total feed costs were greater than the low market value of the accumulated calf weight causing a moderate loss in returns after feed costs ($-3.36) per cow and a moderate loss in returns after feed costs ($-1.51) per acre. The cost per pound of calf weight gain ($0.85/lb) was very high because of the moderate forage dry matter yield per acre, the low crude protein content in the forage, the low animal weight performance per acre, and the moderate land area per cow-calf pair.

Native rangeland forage grazed as a 4.5-month seasonlong pasture during the fall lactation production period was high-cost forage because the quantity of forage dry matter available per acre was low and the crude protein content of the forage was low. Total forage costs for native rangeland grazed as a 4.5-month pasture was high, even though the equipment costs, labor costs, land rent per acre, and forage production costs per acre were very low, because the input costs did not directly regulate livestock forage feed costs. The forage dry matter cost ($72.10/ton) was high because the quantity of forage weight per acre was low. The low forage availability per acre and the low crude protein content in the forage were major causes for the low cow and calf weight performance per acre. The large land area (3.26 acres/month) per cow caused the forage costs per period to be high. The total daily forage feed costs ($0.95/day) were very high. The total feed costs were greater than the low market value of the accumulated calf weight causing a low loss in returns after feed costs ($-0.05) per cow and a low loss in returns after feed costs ($-0.03) per acre. The cost per pound of calf weight gain ($0.70/lb) was high because of the low forage dry matter yield per acre, the low crude protein content in the forage, the low animal weight performance per acre, and the large land area per cow-calf pair.

Altai wildrye grassland grazed as a complementary pasture during the fall lactation production period was low-cost forage because the quantities of crude protein captured per acre were seasonally high, the quantity of forage dry matter available per acre was seasonally high, and the equipment costs, labor costs, land rent per acre, and forage production costs per acre were low. The forage dry matter cost ($27.04/ton) was low because of the high late season forage dry matter production. The land area (1.39 acres) per cow was small because of the crude protein quantities retained in the aboveground plant parts and the seasonally high forage dry matter yield per acre. The total daily forage feed costs ($0.40/day) were low because of the small land area per cow. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($24.76) per cow and in moderate returns after feed costs ($17.81) per acre. The cost per pound of calf weight gain ($0.23/lb) was very low because of the quantity of crude protein contained in the aboveground plant parts, the high forage dry matter yield per acre, and the small land area per cow-calf pair.

Cropland aftermath of annual cereal stubble grazed as a seasonal pasture during the fall lactation production period was high-cost forage because of the low quantity of forage dry matter available per acre and the extremely low quantities of crude protein contained in the forage resulting in cow weight loss of greater than a pound and a half per day and in low calf weight gain of less than half a pound per day. The forage dry matter cost ($29.63/ton) was low because the equipment costs, labor costs, and forage production costs per acre were low and the land rent per acre was very low. The low forage weight per acre made it necessary to provide a large land area (6.63 acres) per cow. The total daily forage feed costs ($0.44/day) were low because the land rent per acre was very low. The total feed costs were greater than the low market value of the accumulated calf weight causing a moderate loss in returns after feed costs ($-4.46) per cow and a low loss in returns after feed costs ($-0.67) per acre. The cost per pound of calf weight gain ($1.05/lb) was very high because of the low forage dry matter per acre, the low crude protein content in the forage, and the large land area required per cow-calf pair.

Spring seeded winter cereal (winter rye) grazed as a seasonal pasture during the fall lactation production period was moderate-cost forage because a relatively moderate quantity of forage dry matter was produced per acre. The winter cereal is seeded during the spring in order for the plants to develop large enough root systems to survive water stress periods during the growing season. On the average, there are two months with water deficiencies great enough to cause water stress in plants each growing season. Only 6% of the past 114 years have not had growing season months with water deficiency. The quantity of herbage available during fall and winter grazing of spring seeded winter cereal pastures is related to the severity and duration of the water stress conditions during the growing season and to the depth of packed snow and ice during the nongrowing season. The forage dry matter cost ($43.77/ton) was moderate because of the relatively moderate forage dry matter production. The land area (0.47 acres) per cow was relatively small because greater than 70% of the herbage was consumed as forage, however, the total daily forage feed costs ($0.66/day) were moderate because only a modest quantity of herbage biomass was produced as a result of growing season water stress. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($22.30) per cow and in high returns after feed costs ($47.45) per acre. The cost per pound of calf weight gain ($0.33/lb) was low because of the high quantity of forage available per acre, the high animal weight performance per acre, and the small land area per cow-calf pair.

Harvested Forage Types

Crested wheatgrass hay cut at a mature growth stage and fed during the fall lactation production period was high-cost forage. The forage dry matter cost ($34.80/ton) was moderate for mature crested wheatgrass hay and lower than the forage dry matter cost per ton for early cut crested wheatgrass hay because greater dry matter weight of the mature crested wheatgrass hay was harvested per acre. The cost per pound of crude protein ($0.28/lb CP) was high for mature crested wheatgrass hay and double the cost per pound of crude protein for early cut crested wheatgrass hay because of the lower crude protein weight in the mature crested wheatgrass hay harvested per acre. The land area (0.56 acres) per cow for mature crested wheatgrass hay was small but greater than the land area required per cow for early cut crested wheatgrass hay because of the greater crude protein weight per acre in the early cut crested wheatgrass hay. The crude protein content of the mature crested wheatgrass forage was below the requirements of a lactating cow making it necessary to provide purchased supplemental crude protein. The total daily forage and supplemental crude protein costs ($0.71/day) were high because of the additional supplemental crude protein costs. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($20.85) per cow and in moderate returns after feed costs ($37.07) per acre. The cost per pound of calf weight gain ($0.35/lb) was moderately low because of the additional supplemental crude protein costs.

Crested wheatgrass hay cut at the boot growth stage and fed during the fall lactation production period was moderate-cost forage. The forage dry matter cost ($40.80/ton) was moderate for early cut crested wheatgrass hay and was greater than the forage dry matter cost per ton for mature crested wheatgrass hay because crested wheatgrass hay cut at the boot stage harvested lower forage dry matter weight per acre than crested wheatgrass hay cut at a mature growth stage. The cost per pound of crude protein ($0.14/lb CP) was low for early cut crested wheatgrass hay and lower than the cost per pound of crude protein for mature crested wheatgrass hay because of the greater crude protein weight in the early cut crested wheatgrass hay harvested per acre. The land area (0.40 acres) per cow for early cut crested wheatgrass hay was small and less than the land area required per cow for mature crested wheatgrass hay because of the greater crude protein weight harvested per acre in the early cut crested wheatgrass hay. The forage cost of early cut crested wheatgrass hay was low but the total daily forage feed cost ($0.57/day) was moderate because about 42% of the ration forage was supplemental roughage which added substantially to the total forage feed costs. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($24.84) per cow and in high returns after feed costs ($62.10) per acre. The cost per pound of calf weight gain ($0.29/lb) was low because of the low cost per pound of crude protein and the small land area per cow-calf pair.

Forage barley hay cut at the milk growth stage and fed during the fall lactation production period was low-cost forage. The production costs per acre were high for early cut forage barley hay because the equipment costs, labor costs, and land rent per acre were high. The forage dry matter cost ($28.80/ton) was low because of the high forage dry matter production. The cost per pound of crude protein ($0.11/lb CP) was low because of the high crude protein weight contained in the forage. The land area (0.12 acres) per cow was very small because of the high crude protein and high forage dry matter yields per acre. The total daily forage and supplemental roughage costs ($0.47/day) were low because of the low cost of crude protein per pound and the high forage dry matter production. The forage costs for early cut forage barley hay were lower than the forage costs for late cut forage barley hay. However, the total forage feed costs for early cut forage barley hay was slightly greater than the total forage feed costs for late cut forage barley hay because of the greater quantity of supplemental roughage in the forage ration for early cut forage barley hay. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($27.98) per cow and in extremely high returns after feed costs ($233.17) per acre. The cost per pound of calf weight gain ($0.23/lb) was very low because of the low cost per pound of crude protein and the very small land area per cow-calf pair.

Forage barley hay cut at the hard dough growth stage and fed during the fall lactation production period was low-cost forage. The production costs per acre were high for late cut forage barley hay because the equipment costs, labor costs, and land rent per acre were high. The forage dry matter cost ($27.40/ton) was low because of the high forage dry matter production. The cost per pound of crude protein ($0.15/lb CP) was low because of the high crude protein weight contained in the forage. The cost per pound of crude protein for late cut forage barley hay was greater than the cost per pound of crude protein for early cut forage barley hay because of the lower crude protein weight harvested per acre in the late cut forage barley hay. The land area (0.16 acres) per cow was very small because of the high crude protein and high forage dry matter yields per acre. The total daily forage and supplemental roughage costs ($0.43/day) were low because of the low cost of crude protein per pound and the high forage dry matter production. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($29.18) per cow and in very high returns after feed costs ($182.38) per acre. The returns after feed costs per acre were lower for late cut forage barley hay than for early cut forage barley hay because late cut forage barley hay had slightly higher crude protein cost per pound and slightly larger land area per cow than early cut forage barley hay. The cost per pound of calf weight gain ($0.21/lb) was very low because of the low cost per pound of crude protein and the very small land area per cow-calf pair.

Oat forage hay cut at the milk growth stage and fed during the fall lactation production period was low-cost forage. The production costs per acre were high for early cut oat forage hay because the equipment costs, labor costs, and land rent per acre were high. The forage dry matter cost ($29.60/ton) was low because of the high forage dry matter production. The cost per pound of crude protein ($0.13/lb CP) was low because of the high crude protein weight contained in the forage. The land area (0.14 acres) per cow was very small because of the high crude protein and high forage dry matter yields per acre. The total daily forage and supplemental roughage costs ($0.47/day) were low because of the low cost of crude protein per pound and the high forage dry matter production. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($27.79) per cow and in extremely high returns after feed costs ($198.50) per acre. The cost per pound of calf weight gain ($0.24/lb) was very low because of the low cost per pound of crude protein and the very small land area per cow-calf pair.

Oat forage hay cut at the hard dough growth stage and fed during the fall lactation production period was low-cost forage. The production costs per acre were high for late cut oat forage hay because the equipment costs, labor costs, and land rent per acre were high. The forage dry matter cost ($26.40/ton) was low because of the high forage dry matter production. The cost per pound of crude protein ($0.17/lb CP) was low because of the high crude protein weight contained in the forage. The cost per pound of crude protein for late cut oat forage hay was greater than the cost per pound of crude protein for early cut oat forage hay because of the lower crude protein weight harvested per acre in the late cut oat forage hay. The land area (0.16 acres) per cow was very small because of the high crude protein and high forage dry matter yields per acre. The crude protein content of the forage was below the requirements of a lactating cow making it necessary to provide purchased supplemental crude protein. The total daily forage and supplemental crude protein costs ($0.45/day) were moderately low because of the additional cost of the supplemental crude protein. The forage costs for early cut oat forage hay were lower than the forage costs for late cut oat forage hay. However, the total forage feed costs for late cut oat forage hay were slightly lower than the total forage feed costs for early cut oat forage hay because of the quantity of supplemental roughage in the forage ration for early cut oat forage hay. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($28.59) per cow and in very high returns after feed costs ($178.69) per acre. The returns after feed costs per acre were lower for late cut oat forage hay than for early cut oat forage hay because late cut oat forage hay had slightly higher crude protein cost per pound and slightly larger land area per cow than early cut oat forage hay.

The cost per pound of calf weight gain ($0.22/lb) was very low because of the very small land area per cow-calf pair.

Pea forage hay cut at an early growth stage and fed during the fall lactation production period was moderate-cost forage. However, pea forage hay cut at a late growth stage has lower forage feed costs and greater revenue returns after feed costs than early cut pea forage hay. The production costs per acre were high for early cut pea forage hay because the equipment costs, labor costs, seed costs, and land rent per acre were high. The forage dry matter cost ($55.00/ton) was high because of the modest forage dry matter production. The cost per pound of crude protein ($0.15/lb CP) was low because of the high crude protein weight contained in the forage. The land area (0.14 acres) per cow was very small because of the high crude protein yield per acre. The total daily forage and supplemental roughage costs ($0.67/day) were high because of the modest forage dry matter production per acre and the high supplemental roughage costs. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($21.81) per cow and very high returns after feed costs ($155.78) per acre. The cost per pound of calf weight gain ($0.34/lb) was moderately low because of the low cost per pound of crude protein and the very small land area per cow-calf pair.

Pea forage hay cut at a late growth stage and fed during the fall lactation production period was low-cost forage. Late cut pea forage hay has lower forage feed costs and greater revenue returns after feed costs than early cut pea forage hay. The production costs per acre were high for late cut pea forage hay because the equipment costs, labor costs, seed costs, and land rent per acre were high. The forage dry matter cost ($37.40/ton) was moderate because of the high forage dry matter production. The cost per pound of crude protein ($0.13/lb CP) was low because of the high crude protein weight contained in the forage. The land area (0.11 acres) per cow was very small because of the high crude protein and high forage dry matter yields per acre. The total daily forage and supplemental roughage costs ($0.55/day) were low because of the low cost of crude protein per pound and the very small land area per cow. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($25.48) per cow and in extremely high returns after feed costs ($231.64) per acre. The cost per pound of calf weight gain ($0.28/lb) was low because of the low cost per pound of crude protein and the very small land area per cow-calf pair.

Forage lentil hay cut at an early growth stage and fed during the fall lactation production period was high-cost forage. However, forage lentil hay cut at a late growth stage has lower forage feed costs and greater revenue returns after feed costs than early cut forage lentil hay. The production costs per acre were high for early cut forage lentil hay because the equipment costs, labor costs, and land rent per acre were high. The forage dry matter cost ($71.60/ton) was high because of the modest forage dry matter yield per acre. The cost per pound of crude protein ($0.17/lb CP) was low because of the high crude protein weight contained in the forage. The land area (0.21 acres) per cow was small because of the moderately high crude protein yield per acre. The total daily forage and supplemental roughage costs ($0.75/day) were high because of the modest forage dry matter production per acre and the high supplemental roughage costs. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($19.39) per cow and in high returns after feed costs ($92.33) per acre. The cost per pound of calf weight gain ($0.38/lb) was moderately low because of the low cost per pound of crude protein and the small land area per cow-calf pair.

Forage lentil hay cut at a late growth stage and fed during the fall lactation production period was low-cost forage. Late cut forage lentil hay has lower forage feed costs and greater revenue returns after feed costs than early cut forage lentil hay. The production costs per acre were high for late cut forage lentil hay because the equipment costs, labor costs, and land rent per acre were high. The forage dry matter cost ($37.00/ton) was moderate because of the high forage dry matter production. The cost per pound of crude protein ($0.13/lb CP) was low because of the high crude protein weight contained in the forage. The land area (0.13 acres) per cow was very small because of the high crude protein and high forage dry matter yields per acre. The total daily forage and supplemental roughage costs ($0.56/day) were low because of the low cost of crude protein per pound and the very small land area per cow. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($25.33) per cow and in extremely high returns after feed costs ($194.85) per acre. The cost per pound of calf weight gain ($0.28/lb) was low because of the low cost per pound of crude protein and the very small land area per cow-calf pair.

Oat-pea hay cut at compromised plant growth stages and fed during the fall lactation production period was low-cost forage. However, seeding oat forage separately on half of the field and cutting it at an early growth stage and seeding pea forage separately on half of the field and cutting it at a late growth stage will result in lower production costs per acre, lower forage dry matter costs per ton, lower costs per pound of crude protein, lower total forage feed costs per day, lower costs per pound of calf weight gain, greater net returns after feed costs per cow, and greater net returns after feed costs per acre than oat-pea forage seeded together and cut at compromised growth stages. The production costs per acre were very high for oat-pea hay because the equipment costs, labor costs, seed costs, and land rent per acre were high. The forage dry matter cost ($37.20/ton) was moderate because of the high forage dry matter production. The cost per pound of crude protein ($0.16/lb CP) was low because of the high crude protein weight contained in the forage. The land area (0.12 acres) per cow was very small because of the high crude protein and high forage dry matter yields per acre. The total daily forage and supplemental roughage costs ($0.55/day) were low because of the low cost of crude protein per pound and the very small land area per cow. The total feed costs were lower than the low market value of the accumulated calf weight resulting in moderate returns after feed costs ($25.40) per cow and in extremely high returns after feed costs ($211.67) per acre. The cost per pound of calf weight gain ($0.28/lb) was low because of the low cost per pound of crude protein and the very small land area per cow-calf pair.

Table 48. Costs and returns for native rangeland pasture forage types to be grazed by range cows during the 30-day fall lactation production period.

		Native Rangeland Repeated Seasonal	Native Rangeland 6.0-m Seasonlong	Native Rangeland 5.5-m Seasonlong	Native Rangeland Deferred Grazing	Native Rangeland 4.5-m Seasonlong
Days		30	30	30	30	15
Growth Stage		fall	fall	fall	fall	fall
Herbage Weight	lb/ac	797	891	1423	1649	973
Forage DM Weight	lb/ac	199	223	356	412	243
Costs/Acre						
Land Rent	$	8.76	8.76	8.76	8.76	8.76
Custom Work	$					
Seed Cost	$					
Baling Costs	$					
Production Costs	$/ac	8.76	8.76	8.76	8.76	8.76
Forage DM Costs	$/ton	88.85	78.57	49.21	42.52	72.10
Crude Protein	%	4.8				
Crude Protein Yield	lb/ac	9.55				
Crude Protein Cost	$/lb	0.92				
Forage Allocation	lb/d	30.0	30.0	30.0	30.0	26.0
Land Area/Period	ac	4.60	4.04	2.53	2.18	1.63
Forage Costs/Period	$/pp	40.30	35.39	22.16	19.53	14.28
Supplementation						
Roughage/Day	lb/d					
Crude Protein/Day	lb/d	1.21				
Sup. Cost/Period	$/pp	10.90				
Total Feed Cost	$/pp	51.20	35.39	22.16	19.53	14.28
Cost/Day	$/d	1.71	1.18	0.74	0.65	0.95
Accumulated Calf Wt.	lbs	54.00	17.73	27.60	23.10	20.33
Weight Value @$0.70/lb	$	37.80	12.41	19.32	16.17	14.23
Net Return/c-c pr	$	-13.40	-22.98	-2.84	-3.36	-0.05
Net Return/acre	$	-2.91	-5.69	-1.12	-1.51	-0.03
Cost/lb of Calf Gain	$	0.95	1.99	0.80	0.85	0.70

Table 49. Costs and returns for domesticated grassland, cropland, and annual winter cereal pasture forage types to be grazed by range cows during the 30-day fall lactation production period.

		Altai Wildrye Complementary Pasture	Cropland Aftermath Seasonal Pasture	Spring Seeded Winter Cereal Seasonal Pasture
Days		30	30	30
Growth Stage		fall	fall	Vegetative
Herbage Weight	lb/ac	2590	270	
Forage DM Weight	lb/ac	648	135	1908
Costs/Acre				
Land Rent	$	8.76	2.00	22.07
Custom Work	$			16.08
Seed Cost	$			3.60
Baling Costs	$			
Production Costs	$/ac	8.76	2.00	41.75
Forage DM Costs	$/ton	27.04	29.63	43.77
Crude Protein	%			
Crude Protein Yield	lb/ac			
Crude Protein Cost	$/lb			
Forage Allocation	lb/d	30.0	30.0	30.0
Land Area/Period	ac	1.39	6.63	0.47
Forage Costs/Period	$/pp	12.18	13.26	19.70
Supplementation				
Roughage/Day	lb/d			
Crude Protein/Day	lb/d			
Sup. Cost/Period	$/pp			
Total Feed Cost	$/pp	12.18	13.26	19.70
Cost/Day	$/d	0.40	0.44	0.66
Accumulated Calf Wt.	lbs	52.77	12.57	60.00
Weight Value @$0.70/lb	$	36.94	8.80	42.00
Net Return/c-c pr	$	24.76	-4.46	22.30
Net Return/acre	$	17.81	-0.67	47.45
Cost/lb of Calf Gain	$	0.23	1.05	0.33

Table 50. Costs and returns for perennial grass harvested forage types to be fed to range cows during the 30-day fall lactation production period.

		Crested Wheatgrass Hay	Crested Wheatgrass Hay
Days		30	30
Growth Stage		Mature	Boot stage
Herbage Weight	lb/ac	-	-
Forage DM Weight	lb/ac	1600	1300
Costs/Acre			
Land Rent	$	14.22	14.22
Custom Work	$	5.31	5.31
Seed Cost	$	-	-
Baling Costs	$	8.58	6.97
Production Costs	$/ac	28.11	26.50
Forage DM Costs	$/ton	34.80	40.80
Crude Protein	%	6.4	14.5
Crude Protein Yield	lb/ac	102	189
Crude Protein Cost	$/lb	0.28	0.14
Forage Allocation	lb/d	30.0	17.3
Land Area/Period	ac	0.56	0.40
Forage Costs/Period	$/pp	15.84	10.50
Supplementation			
Roughage/Day	lb/d		12.7
Crude Protein/Day	lb/d	0.59	
Sup. Cost/Period	$/pp	5.31	6.66
Total Feed Cost	$/pp	21.15	17.16
Cost/Day	$/d	0.71	0.57
Accumulated Calf Wt.	lbs	60.0	60.0
Weight Value @$0.70/lb	$	42.00	42.00
Net Return/c-c pr	$	20.85	24.84
Net Return/acre	$	37.07	62.10
Cost/lb of Calf Gain	$	0.35	0.29

Table 51. Costs and returns for annual cereal harvested forage types to be fed to range cows during the 30-day fall lactation production period.

		Forage Barley Hay	Forage Barley Hay	Oat Forage Hay	Oat Forage Hay
Days		30	30	30	30
Growth Stage		Milk	Hard Dough	Milk	Hard Dough
Herbage Weight	lb/ac				
Forage DM Weight	lb/ac	4733	5133	4667	5667
Costs/Acre					
Land Rent	$	22.07	22.07	22.07	22.07
Custom Work	$	16.08	16.08	16.08	16.08
Seed Cost	$	4.69	4.69	6.00	6.00
Baling Costs	$	25.37	27.51	25.02	30.38
Production Costs	$/ac	68.21	70.35	69.17	74.53
Forage DM Costs	$/ton	28.80	27.40	29.60	26.40
Crude Protein	%	13.0	9.2	11.5	7.8
Crude Protein Yield	lb/ac	606	468	535	435
Crude Protein Cost	$/lb	0.11	0.15	0.13	0.17
Forage Allocation	lb/d	19.3	27.3	21.8	30.0
Land Area/Period	ac	0.12	0.16	0.14	0.16
Forage Costs/Period	$/pp	8.40	11.40	9.90	11.88
Supplementation					
Roughage/Day	lb/d	10.7	2.7	8.2	
Crude Protein/Day	lb/d				0.17
Sup. Cost/Period	$/pp	5.62	1.42	4.31	1.53
Total Feed Cost	$/pp	14.02	12.82	14.21	13.41
Cost/Day	$/d	0.47	0.43	0.47	0.45
Accumulated Calf Wt.	lbs	60.0	60.0	60.0	60.0
Weight Value @$0.70/lb	$	42.00	42.00	42.00	42.00
Net Return/c-c pr	$	27.98	29.18	27.79	28.59
Net Return/acre	$	233.17	182.38	198.50	178.69
Cost/lb of Calf Gain	$	0.23	0.21	0.24	0.22

Table 52. Costs and returns for annual legume harvested forage types to be fed to range cows during the 30-day fall lactation production period.

		Pea Forage Hay	Pea Forage Hay	Forage Lentil Hay	Forage Lentil Hay	Oat-Pea Hay
Days		30	30	30	30	30
Growth Stage		Early	Late	Early	Late	
Herbage Weight	lb/ac					
Forage DM Weight	lb/ac	2800	4650	1667	3867	5143
Costs/Acre						
Land Rent	$	22.07	22.07	22.07	22.07	22.07
Custom Work	$	16.08	16.08	16.08	16.08	16.08
Seed Cost	$	23.80	23.80	12.60	12.60	29.80
Baling Costs	$	15.01	24.92	8.94	20.73	27.57
Production Costs	$/ac	79.96	86.87	59.69	71.48	95.52
Forage DM Costs	$/ton	55.00	37.40	71.60	37.00	37.20
Crude Protein	%	18.9	14.4	21.8	14.7	12.5
Crude Protein Yield	lb/ac	526	685	361	567	611
Crude Protein Cost	$/lb	0.15	0.13	0.17	0.13	0.16
Forage Allocation	lb/d	13.3	17.4	11.5	17.1	20.1
Land Area/Period	ac	0.14	0.11	0.21	0.13	0.12
Forage Costs/Period	$/pp	11.40	9.90	12.90	9.90	11.40
Supplementation						
Roughage/Day	lb/d	16.7	12.6	18.5	12.9	9.9
Crude Protein/Day	lb/d					
Sup. Cost/Period	$/pp	8.79	6.62	9.71	6.77	5.20
Total Feed Cost	$/pp	20.19	16.52	22.61	16.67	16.60
Cost/Day	$/d	0.67	0.55	0.75	0.56	0.55
Accumulated Calf Wt.	lbs	60.0	60.0	60.0	60.0	60.0
Weight Value @$0.70/lb	$	42.00	42.00	42.00	42.00	42.00
Net Return/c-c pr	$	21.81	25.48	19.39	25.33	25.40
Net Return/acre	$	155.78	231.64	92.33	194.85	211.67
Cost/lb of Calf Gain	$	0.34	0.28	0.38	0.28	0.28

Table 53. Feed quantity and land area for forage types used during the 30-day fall lactation production period.

Forage Types	Daily Feed per Cow			Fall Lactation Period Feed one Cow for 30 days			
	Forage lb/d	Roughage lb/d	Crude Protein lb/d	Forage lb/pp	Roughage lb/pp	Crude Protein lb/pp	Land Area ac/pp
Pasture Forage Types							
Native Rangeland Repeated Seasonal	30.0		1.21	900.0		36.30	4.60
6.0-m Seasonlong	30.0			900.0			4.04
5.5-m Seasonlong	30.0			900.0			2.53
Deferred Grazing	30.0			900.0			2.18
4.5-m Seasonlong (15d)	26.0			390.0			1.63
Altai Wildrye	30.0			900.0			1.39
Crop Aftermath	30.0			900.0			6.63
Spring Seeded Winter Cereal	30.0			900.0			0.47
Harvested Forage Types							
Crested Wheat, mature	30.0		0.59	900.0		17.70	0.56
Crested Wheat, early	17.3	12.7		519.0	381.0		0.40
Forage Barley, early	19.3	10.7		579.0	321.0		0.12
Forage Barley, late	27.3	2.7		819.0	81.0		0.16
Oat Forage, early	21.8	8.2		654.0	246.0		0.14
Oat Forage, late	30.0		0.17	900.0		5.10	0.16
Pea Forage, early	13.3	16.7		399.0	501.0		0.14
Pea Forage, late	17.4	12.6		522.0	378.0		0.11
Forage Lentil, early	11.5	18.5		345.0	555.0		0.21
Forage Lentil, late	17.1	12.9		513.0	387.0		0.13
Oat-Pea Forage	20.1	9.9		603.0	297.0		0.12

Table 54. Summary of feed costs for forage types used during the 30-day fall lactation production period.

Forage Types	Forage Costs $/pp	Roughage Costs $/pp	Crude Protein Costs $/pp	Total Feed Costs $/pp	Daily Feed Costs $/d
Pasture Forage Types					
Native Rangeland					
Repeated Seasonal	40.30		10.90	51.20	1.71
6.0-m Seasonlong	35.39			35.39	1.18
5.5-m Seasonlong	22.16			22.16	0.74
Deferred Grazing	19.53			19.53	0.65
4.5-m Seasonlong (15d)	14.28			14.28	0.95
Altai Wildrye	12.18			12.18	0.40
Cropland Aftermath	13.26			13.26	0.44
Spring Seeded Winter Cereal	19.70			19.70	0.66
Harvested Forage Types					
Crested Wheat, mature	15.84		5.31	21.15	0.71
Crested Wheat, early	10.50	6.66		17.16	0.57
Forage Barley, early	8.40	5.62		14.02	0.47
Forage Barley, late	11.40	1.42		12.82	0.43
Oat Forage, early	9.90	4.31		14.21	0.47
Oat Forage, late	11.88		1.53	13.41	0.45
Pea Forage, early	11.40	8.79		20.19	0.67
Pea Forage, late	9.90	6.62		16.52	0.55
Forage Lentil, early	12.90	9.71		22.61	0.75
Forage Lentil, late	9.90	6.77		16.67	0.56
Oat-Pea Forage	11.40	5.20		16.60	0.55

Table 55. Summary of returns after feed costs for forage types used during the 30-day fall lactation production period.

Forage Types	Gross Return @$0.70/lb $/calf	Net Return per C-C pr $/pr	Net Return per acre $/ac	Calf Gain Cost $/lb
Pasture Forage Types				
Native Rangeland				
Repeated Seasonal	37.80	-13.40	-2.91	0.95
6.0-m Seasonlong	12.41	-22.98	-5.69	1.99
5.5-m Seasonlong	19.32	-2.84	-1.12	0.80
Deferred Grazing	16.17	-3.36	-1.51	0.85
4.5-m Seasonlong (15d)	14.23	-0.05	-0.03	0.70
Altai Wildrye	36.94	24.76	17.81	0.23
Cropland Aftermath	8.80	-4.46	-0.67	1.05
Spring Seeded Winter Cereal	42.00	22.30	47.45	0.33
Harvested Forage Types				
Crested Wheat, mature	42.00	20.85	37.07	0.35
Crested Wheat, early	42.00	24.84	62.10	0.29
Forage Barley, early	42.00	27.98	233.17	0.23
Forage Barley, late	42.00	29.18	182.38	0.21
Oat Forage, early	42.00	27.79	198.50	0.24
Oat Forage, late	42.00	28.59	178.69	0.22
Pea Forage, early	42.00	21.81	155.78	0.34
Pea Forage, late	42.00	25.48	231.64	0.28
Forage Lentil, early	42.00	19.39	92.33	0.38
Forage Lentil, late	42.00	25.33	194.85	0.28
Oat-Pea Forage	42.00	25.40	211.67	0.28