Complementary Spring and Fall Pastures

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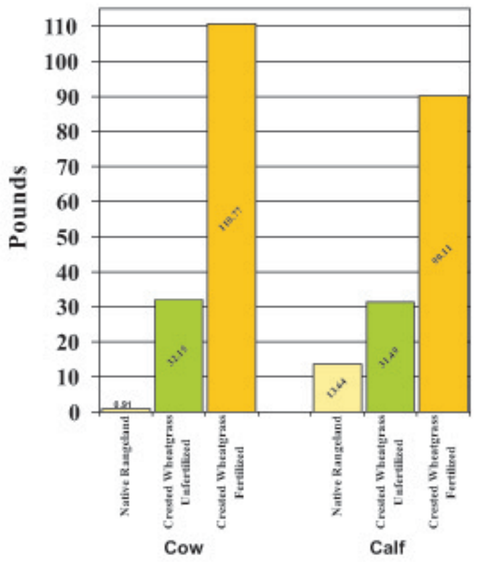


Cow and calf weight gain per acre during May (31 days).

Costs and returns for cow-calf pairs during May (31 days).

	Native Rangeland	Crested Wheatgrass Unfertilized	Crested Wheatgrass Fertilized
Acres per Period	4.04	1.88	0.75
Pasture Costs	$35.65	$16.47	$15.95
Calf Weight Value @ $0.70/lb	$39.06	$41.45	$47.31
Net Return/c-c pr	$3.41	$24.98	$31.36
Net Return/acre	$0.83	$13.29	$41.82
Cost/lb Calf Gain	$0.64	$0.27	$0.24

Evaluation of Spring Pastures Grazed during May

- Spring native rangeland forage grazed during May has pasture rent value or production costs of $8.76 per acre and forage dry matter costs of $77.52 per ton. A cow with a calf would require 4.04 acres per month, at a cost of $35.65 for a period, or $1.15 per day. Cows grazing native rangeland during May gained weight at a rate of 0.12 lbs per day and 0.91 lbs per acre and calves gained weight at a rate of 1.80 lbs per day and 13.64 lbs per acre; accumulated weight gain was 55.80 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $39.06 per calf, and the net returns after pasture costs were $3.41 per cow-calf pair and $0.83 per acre. The cost of calf weight gain was $0.64 per pound.
- Spring unfertilized crested wheatgrass complementary pasture grazed for 31 days during May has pasture rent value or production costs of $8.76 per acre and forage dry matter costs of $35.39 per ton. A cow with a calf would require 1.88 acres per period, at a cost of $16.47 for the 31-day period, or $0.52 per day. Cows grazing unfertilized crested wheatgrass during May gained weight at a rate of 1.95 lbs per day and 32.15 lbs per acre and calves gained weight at a rate of 1.91 lbs per day and 31.49 lbs per acre; accumulated weight gain was 59.21 lbs. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $41.45 per calf, and the net returns after pasture costs were $24.98 per cow-calf pair and $13.29 per acre. The cost of calf weight gain was $0.27 per pound.
- Spring fertilized crested wheatgrass complementary pasture grazed for 31 days during May has pasture rent value of $8.76 per acre and fertilizer costs of $12.50 per acre; the resulting production costs are $21.26 per acre and forage dry matter costs are $34.29 per ton. A cow with a calf would require 0.75 acres per period, at a cost of $15.95 for the 31-day period, or $0.51 per day. Cows grazing fertilized crested wheatgrass during May gained weight at a rate of 2.68 lbs per day and 110.77 lbs per acre and calves gained weight at a rate of 2.18 lbs per day and 90.11 lbs per acre; accumulated weight gain was 67.58 lbs on 0.75 acres. When calf accumulated weight was assumed to have a value of $0.70 per pound, the gross return was $47.31 per calf, and the net returns after pasture costs were $31.36 per cow-calf pair and $41.82 per acre. The cost of calf weight gain was $0.24 per pound.

- Grazing native rangeland before early June and after mid October causes varying degrees of biological damage to grassland plants and ecosystem processes.
- Cow-calf weight performance on native rangeland is poor before early June because of insufficient forage quantity and after mid October because of insufficient forage quality.
- The land area required to provide forage for a cow-calf pair on native rangeland before early June and after mid October is greater than twice the land area required per month during the period from early June to mid October.
- Grazing other types of perennial grass pastures before early June and after mid October complements native rangeland pastures grazed during the appropriate period–from early June to mid October–and eliminates the problems caused by early and late grazing of native rangeland.
- Crested wheatgrass pastures can be grazed during May because the plants are physiologically ahead of native rangeland plants by about four weeks.
- Altai wildrye pastures can be grazed during mid October to mid November because the plants retain nutrient quality in the aboveground portions beyond mid October.
- Increased livestock weight performance occurs because of improved efficiency of nutrient capture and conversion when complementary combinations of pasture-forage types, like crested wheatgrass-native rangeland-Altai wildrye, are grazed in sequence so that the herbage production curves and nutritional quality curves meet the cow and calf dietary quantity and quality requirements during the entire grazing season.

Problems caused by grazing native rangeland during May

Native grasses are not biologically ready for grazing during May. After the lead tillers have reached the three and a half new leaf stage, grass plants have sufficient leaf area and are physiologically capable of tolerating grazing pressure. The three and a half new leaf stage is reached by most native cool-season grasses around early June and by most native warm-season grasses around mid June. Grazing native grasses too early–before lead tillers have formed all of the current season's leaf buds and before the tillers have produced adequate leaf area to support plant growth at normal rates–weakens the plants and diminishes their ability to produce herbage. The earlier defoliation begins, the greater the loss of herbage production and the longer the recovery time will be. When grazing on native rangeland is started in early May, more than 75% of the potential herbage biomass will not be produced. When grazing is started in mid May, 45% to 60% of the potential herbage biomass will not be produced.

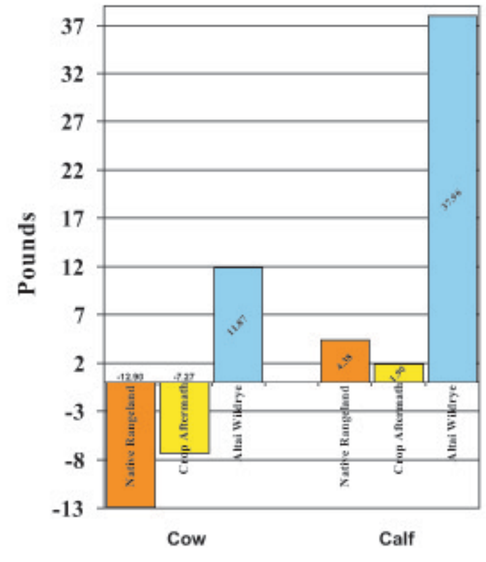
Crested wheatgrass lead tillers reach the three and a half new leaf stage around late April and the pastures are ready to graze in early May.

Problems caused by grazing native rangeland during mid October to mid November

Late-season grazing removes leaf area needed by overwintering tillers, reduces carbohydrate reserves, decreases robustness of spring growth, and reduces subsequent herbage production. Perennial grasses are perpetuated primarily through vegetative reproduction by tillering rather than through sexual reproduction and the growth of seedlings. Secondary tillers that have not entered the sexually reproductive stage and fall tillers, which grow from the crowns of perennial grasses after mid August, remain viable over the winter and complete their growth stages the following year as lead tillers. Winter survival and spring regrowth of vegetative tillers depend on the plant's having adequate carbohydrate reserves. The quantity of carbohydrates stored during the winter hardening process is closely related to the amount of active leaf material on each tiller. Grazing native rangeland during the fall removes leaf tissue from the secondary tillers and fall tillers and results in a great reduction in leaf height and herbage biomass production during the succeeding growing season.

Nutritional quality of native rangeland herbage is below the requirements of a lactating cow during the latter portion of the grazing season. Perennial grass plant phenological growth and development are determined by the length of day light and are consistent from year to year. As the plants mature during the growing season, leaf cell contents are translocated to belowground parts, and herbage weight and nutrient quality of the plant decrease. Nutritional content of native grasses managed by traditional grazing practices drops below the crude protein requirements of a lactating cow in mid to late July. Managing native grasses with biologically effective grazing practices that manipulate vegetative reproduction increases secondary tiller production and improves the nutritional quality of the herbage sufficiently to meet the requirements of a lactating cow for an additional two to two and a half months. The biology of native grass plants does not permit extending these improved nutritional conditions beyond mid October.

Translocation of leaf cell contents is delayed in Altai wildrye and the nutritional quality does not drop below the requirements of a lactating cow until sometime after October.



Cow and calf weight gain per acre during mid October to mid November (30 days).

Costs and returns for cow-calf pairs during mid October to mid November (30 days).

	Native Rangeland	Cropland Aftermath	Altai Wildrye
Acres per Period	4.04	6.63	1.39
Pasture Costs	$35.39	$13.26	$12.00
Calf Weight Value @ $0.70/lb	$12.41	$8.80	$36.94
Net Return/c-c pr	$-22.98	$-4.46	$24.76
Net Return/acre	$-5.69	$-0.67	$17.81
Cost/lb Calf Gain	$2.00	$1.05	$0.23

Evaluation of Fall Pastures Grazed during mid October to mid November

- Fall native rangeland forage grazed for 30 days during mid October to mid November has pasture rent value or production costs of $8.76 per acre and forage dry matter costs of $78.57 per ton. A cow with a calf would require 4.04 acres per month, at a cost of $35.39 for the 30-day period, or $1.18 per day. Lactating cows that grazed native rangeland during mid October to mid November lost 1.74 lbs per day and lost 12.90 lbs per acre and calves gained weight at a rate of 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 $2.00 per pound.
- Cropland aftermath forage grazed for 30 days during mid October to mid November has production costs of $2.00 per acre and forage dry matter costs of $29.63 per ton. A cow with a calf would require 6.63 acres per month, at a cost of $13.26 for the 30-day period, or $0.44 per day. Lactating cows that grazed cropland aftermath of annual cereal residue between mid October and mid November lost 1.61 lbs per day and lost 7.27 lbs per acre and calves gained weight at a rate of 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.
- Altai wildrye complementary pasture grazed during mid October to mid November has pasture rent value or production costs of $8.76 per acre and forage dry matter costs of $27.04 per ton. A cow with a calf would require 1.39 acres per month, at a cost of $12.00 for the 30-day period, or $0.40 per day. Lactating cows that grazed Altai wildrye pastures for 30 days between mid October and mid November gained weight at a rate of 0.55 lbs per day and 11.87 lbs per acre and calves gained weight at a rate of 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.