

BIOLOGICAL AND ECONOMIC SYNERGIES OF INTEGRATING BEEF COWS AND FIELD CROPS

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Introduction

Most cattlemen rely on range and pasture grasses as their primary forage resources for their beef cows. Beef cows in the integrated crops/cows scenarios are often considered as scavengers, consuming otherwise low value or unmarketable feeds and forages. Sustainable crop rotations are increasingly using annual grasses and forages for a variety of reasons including weed control, break disease cycles, and hay production. Annual grasses include corn, wheat, barley, oats, millet, sorghum, and sudan. The residue of crops harvested for grain is a forage resource. Cows consuming biomass produce manure which is a valuable fertilizer to the cropping systems.

Nutrition

The collective results of several studies have shown that cows can be fed a wide variety of feeds in balanced diets that support satisfactory reproductive performance, good cow condition, and healthy calves. More responsibility falls on the manager to meet the cows needs when non-traditional feeding practices are used but there is increasing nutritional knowledge available to use a number of alternative feeds appropriately.

Some of the feeds used successfully for lactating cows include small grain straws (wheat, oats, barley), oilseed meals (crambe, canola, sunflower), screenings (wheat, sunflower, pea, flax, barley), co-product feeds (soyhulls, barley malt pellets, wheat midds, oat hulls, potato processing waste, corn processing co-products), and more conventional grains like corn and barley. In many cases, co-product feeds are preferred over grains as the starch from grains will lower digestibility of forages due to a shift away from fiber digesting microbes in the rumen. Grains should be limited to 4 lbs. per day or less for optimum fiber digestion.

Palatability is an important factor for livestock diets, although cows are less sensitive to the flavor of feeds than calves. Glucosinolates in crambe meal have a bitter flavor but comparative feeding trials suggest this new oilseed meal (30% crude protein) can be fed at up to 50 percent of a supplement formulation in cake or in mixed feeds. Deoxynivalenol or DON in barley had no negative effect on intake, cow condition, or rebreeding, and actually improved calf gains when 12 pounds of 36 ppm DON barley was fed to lactating first calf heifers in a straw-based diet. High fiber feeds such as sunflower screenings and oat hulls have limited and in some cases highly variable nutrient content. These feeds may be purchased at a lower price and any palatability issues can be avoided by mixing with other nutrient dense feeds.

A practical approach is to provide a limited amount of a nutrient dense feed and offer low quality forage such as straw free choice. Supplements can be fed on alternate days without reducing animal performance. Aftermath grazing is an excellent opportunity for cows to consume otherwise unharvested feeds.

In every case described above, cow health and condition should be continually evaluated and changes made in diets or management if problems arise or cow condition is seriously affected. A margin of nutritional safety may be appropriate just before and during breeding season to insure cycling and conception. Consultation with beef cattle specialists is advised if you have questions on feeds or strategies for feeding in drought or other unique scenarios.

Manure applied to cropland or deposited during aftermath grazing will reduce the need for purchased commercial fertilizers. Estimates for the fertility value of manure vary with fecal nitrogen and cost of nitrogen in commercial fertilizer.

Economics of Integrating Cows and Crops

The net economic effect of increased cow/calf production based on cropping system biomass and use of more co-products in-state could be substantial.

A comparison of breakeven costs for producing weaned calves under traditional pasture or with drylot production (Anderson and Meyer, 1983) used a 10-year average of pasture production coefficients from the North Dakota Beef Cattle Improvement Association and coefficients for drylot production developed at the Carrington Center. Feed costs were based on actual production costs. Breakeven prices for marketing weaned calves in this model were \$59.23/cwt. for drylot calves and \$89.78/cwt. for high production pasture calves. Drylot cows require significantly lower capital investment per cow but facility and equipment depreciation is accelerated and labor needs were greater. Salvaged residue and other opportunity feeds provided an advantage in feed cost per head. Total annual cost per head was \$305.70 for drylot cows and \$308.98 for high production range cows.

In a typical east central North Dakota farm modeled for a three-year period, crops or crops plus drylot cows were compared for net returns (Sell and Watt, 1989). Sixty-five beef cows could be supported throughout the year from the cropping system biomass available. Adding cows to the crops-only farm using the same cropping sequence increased requirements for operating capital by \$7200, improved net returns by \$12,166, and lowered the year to year coefficient of variation in income from .85 to .48. Cows require labor and management and at certain times of the year there is potential for conflicting demand. However, cows can spread depreciation of machinery over more enterprises and occupy available labor during months of little cropland activity.

In another model, Sell (1989) concluded that a typical east central North Dakota farm could provide adequate feed biomass for up to 85 head of drylot beef cows. The drylot cow enterprise increased operating capital requirements by \$8241 and improved net returns to overhead for the farm by \$22,190. Production coefficients for animal performance and feed requirements were taken from actual data generated at the Carrington Research Center livestock unit.

The 2001 state-wide average of North Dakota Farm Business Management report compared returns for crops only farms with combined crops and beef cattle operations. Net farm income was averaged for 146 crop farms and 103 crop and beef farms. Net returns increased from \$34,916 to \$37,554 with the addition of beef cattle in a year with a relatively soft cattle market. In addition, labor and management earnings were reported as \$12,304 for crops only and \$18,063 for crops and cows operations, with a net worth improvement for crops and cows of \$8986 over crops only. This comparison had not been made in previous years but will be included in all future reports.

Summary

Clearly, synergies exist to improve biological and economic sustainability in crop farms by adding beef cows. Livestock management expertise and reasonable facilities are required for optimum production. Past research with alternative feeds, drylot management, and early weaning gives producers information for feeding and managing a cow herd during drought or for adding an enterprise to capture value of cropping system biomass. North Dakota has a wide variety of abundant feed resources for supporting many more beef cows and for increasing backgrounding and finishing calves. The livestock sector is poised for significant growth which could enhance producer returns as well as the overall economy of North Dakota.