BEEF CATTLE PRODUCTION ON WESTERN JUNIPER RANGELANDS[1]

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Successful beef cattle production is both a science and an art dependent upon three principal components: 1) the forage resource; 2) the animal resource and 3) management alternatives. The science of beef cattle production requires knowledge of the basic biology of both the forage resource environment and cattle. The art of successful beef cattle production puts this knowledge to work by balancing the forage resource with the animal resource using a set of management alternatives to optimize livestock production.

Beef production systems relying on native vegetation of western juniper rangelands necessitate special care in matching forage quality and quantity to requirements of breeding and growing cattle. This is because the relatively short growing season within western juniper rangelands can impose restrictions on the growth and nutrient composition of native forages, and hence red meat production. A review of the nutrient availability of native forage species and nutrient requirements of cattle can point to several management practices which may help increase the efficiency of beef cattle production on these rangelands.

Nutrient availability must be thought of in terms of the chemical composition of forages, and the amount of forage biomass produced. Forage quality is generally related to plant maturity and precipitation. Annual precipitation in the western juniper zone is typically about 8-10 inches. Most precipitation falls during the winter, and the hot summers are usually dry. This weather pattern dictates perennial grasses complete their annual growth cycles while soil moisture remains adequate. Yearly variations in the amount of precipitation make it nearly impossible to predict forage quality at specific dates throughout the growing season, but research has shown a dramatic decline in nutritive value of perennial bunchgrasses from spring through fall. Figure 1 shows this decline averaged over several years and grass species in eastern Oregon.

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[1] The intent of this paper is to summarize our knowledge of methods to enhance beef cattle production on western juniper rangelands. Much of the information for this report is based on the following publications:

Bedell, T.E. 1980. Range nutrition in relation to management. Oregon State University Extension Circular 1045, 4pp.

Vavra, M., and R.J. Raleigh. 1976. Coordinating beef cattle management with the range forage resource. Journal of Range Management, 29(6):449-452.

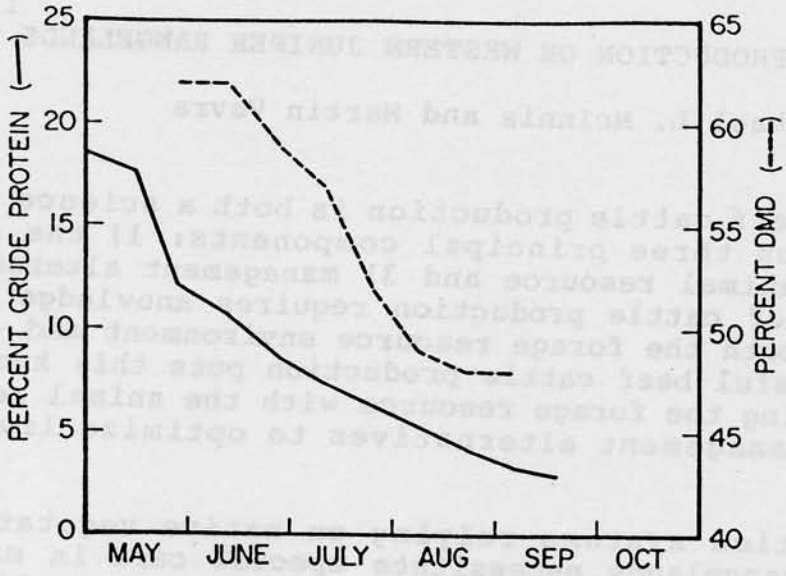

FIGURE 1. Seasonal declines in percent crude protein and dry matter digestibility of perennial bunchgrasses in the Oregon high desert (Bedell 1980).

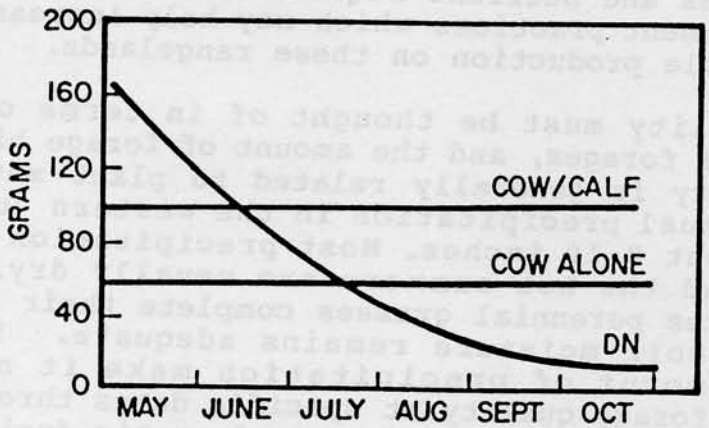

FIGURE 2. Digestible nitrogen provided by range forage (DN) compared to levels required by cows with calves and dry cows. (Bedell 1980).

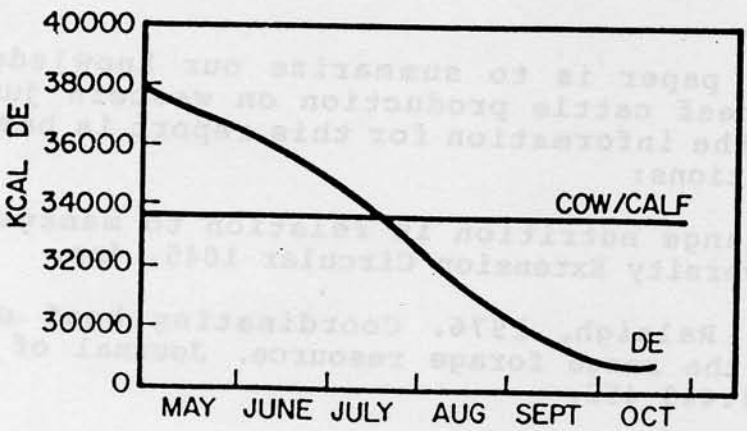

FIGURE 3. Digestible energy provided by range forage (DE) compared to levels required by cows with calves (Bedell 1980).

When animal requirements for protein and digestibility are compared to annual availability of these nutrients from native forages, it is apparent diets may become nutritionally deficient by mid-June to mid-July (Figures 2 and 3). A comparison of these curves shows protein becomes limiting before energy for young cattle and nursing cows. This is one of the principal reasons why performance of these cattle declines rapidly when the forage matures. Studies conducted at the Eastern Oregon Agricultural Research Center (EOARC) in Burns showed a sharp decline in pounds of daily gain for yearling steers and suckling calves beginning in July (Figure 4).

The species composition of range forage can influence animal performance. Plants which mature rapidly (such as Sandberg bluegrass and cheatgrass) also decline rapidly in nutritive value compared to plants which remain green for longer periods of summer months (Figure 5). Bluebunch wheatgrass and Idaho fescue are the characteristic grasses of relatively undisturbed plant communities in the Western Juniper Zone (Franklin and Dyrness 1973). Juniper encroachment and deteriorating range condition can change composition of the herbaceous understory from productive perennial grasses such as these to relatively unproductive species such as cheatgrass and Sandberg bluegrass. The impact on red meat production can be dramatic. Computer simulation shows nearly double the amount of beef produced from juniper rangelands in good condition compared to those in poor condition (McInnis, file data).

In our area, most calves are born between January and May. Cow-calf pairs typically utilize native range until fall or early winter when calves are weaned. Cattle management practices including early weaning, shortening the breeding season, timing of calving, and range supplementation can be used effectively on western juniper rangelands to optimize beef cattle production.

An alternative to allowing calves to stagnate on declining forage quality is to wean them sooner than usual and feed them a high quality forage. Work conducted at EOARC showed nearly twice the average daily gain on calves weaned at 177 days and fed a ration containing meadow hay, barley, and cottonseed meal as compared to calves which remained with their dams until mid-October (Wallace and Raleigh 1961).

A short breeding season is one method of realizing greater efficiency from the forage resource. Advantages of a shorter breeding season include a more uniform calf crop that can be put on a single feeding and management program at weaning, increased weaning weights, and the ability to identify low producing cows. A breeding season of about 63 days (3 estrous cycles) allows animals to be maintained on highly productive pastures for better nutrition.

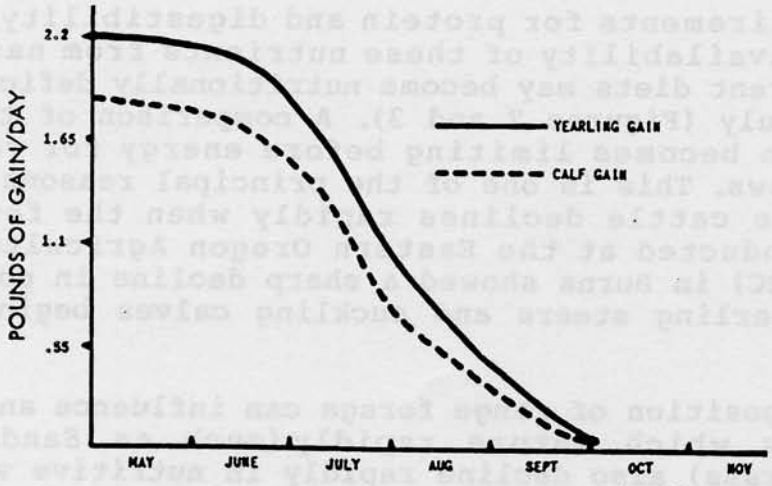

FIGURE 4. Average daily gain of yearling steers and suckling calves in eastern Oregon (Vavra and Raleigh 1976).

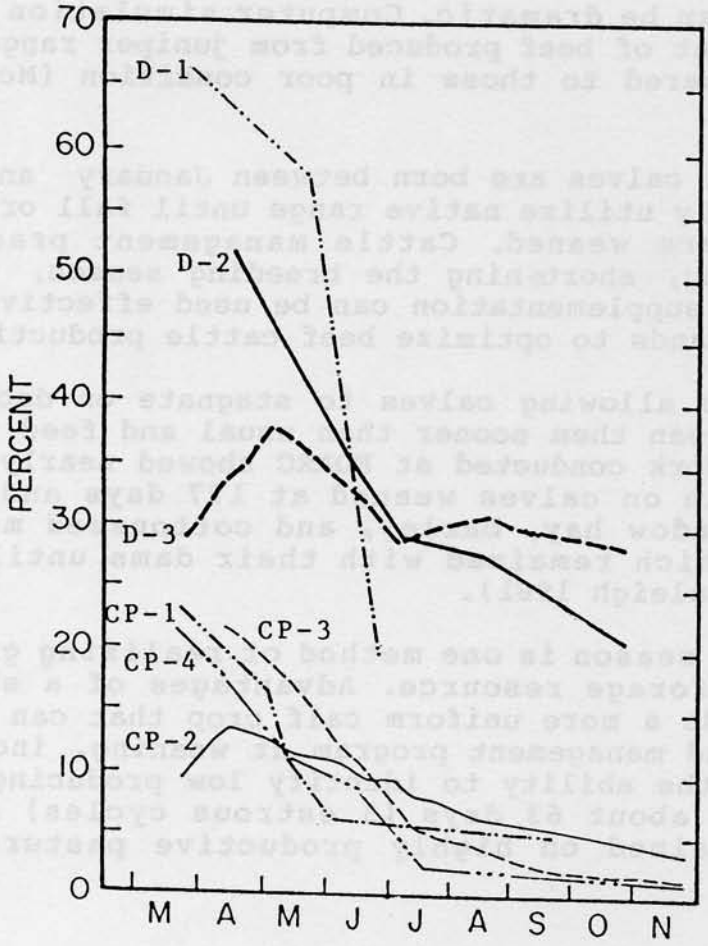

FIGURE 5. Seasonal trends in crude protein (CP) and apparent digestibility (D) of Sandberg bluegrass (1), bluebunch wheatgrass (2), Idaho fescue (3), and cheatgrass (4) in south-central Oregon (Bedell 1980).

In our area, calves are born at a time when native range forage is at its highest nutritional value. By the time a calf begins to consume this forage, its quality is declining rapidly. More efficient use of the forage resource could be made if calving could be timed so that a calf is old enough to utilize these plants when they reach their peak production and quality. Calving during October and November has several advantages: cows are confined to hay meadows where diseases can be easily treated; fall weather is usually more favorable than during cold spring months; and breeding can be accomplished while cows are still concentrated.

Supplementation of range forage can help fill the "nutrient gap" common on juniper rangelands by mid-summer. In developing a supplementation program it is important to first estimate the amount of nutrients consumed by cattle grazing native forages. This will provide the information necessary to determine the amount of supplement required to maintain practical rates of gain. A supplementation program developed at EOARC produced an additional 100 pounds of gain on yearling steers during a 120-day period with an average of 2 pounds of supplement per head per day (Raleigh 1960).

Finally, the beef production business is really the business of growing grass. Western juniper rangelands maintained in good condition will generate more forage of higher quality than degraded environments. It is a truism that "grass is wealth". The key to beef cattle management in the Western Juniper Zone, as elsewhere, is to match the forage resource with the animal resource using a set of management practices to maintain a sustained yield of the forage crop.

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Franklin, J.F., and C.T. Dyrness. 1973. Natural vegetation of Oregon and Washington. USDA Forest Service, General Technical Report PNW-8. 417pp.

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