

Multispecies Grazing by Cattle and Sheep

S.H.M. Esmail

In multispecies grazing, cattle and sheep may graze together in a pasture or graze at alternate times. These systems have long been utilized in North America, Europe, Australia, and more recently in Africa. The primary objective of multispecies grazing is to better utilize pastures and improve animal production.

Animals of different grazing habits and biological structures often complement each other when joined in a grazing system. In a combined mode they are better able to exploit nutrients and to resist adverse conditions than when grazing separately. Following are some general aspects of multispecies grazing by cattle and sheep, with special emphasis on ecological and economical benefits, mechanisms utilized in various systems, and factors determining maximum potential under various farming conditions. Combinations other than cattle and sheep are also briefly discussed.

Multispecies Grazing Effects on Pasture Growth and Animal Production

In comparing multi- and single-species grazing, it is important to consider the relative effects on pasture productivity, feed intake, and nutritive value, which affect both individual animal performance and output per unit area.

Studies in New Zealand comparing chemical characteristics of cattle and sheep urine voided on ryegrass pastures showed a 50% loss of nitrogen in cattle urine, compared to a 12–26% loss in sheep urine, as measured by the increased level of ammonia in the soil surface and the higher soil pH under cattle grazing (Doak 1952). It was suggested that the overall losses of nitrogen would be less under multispecies grazing than under grazing of cattle alone. Pasture growth could possibly be improved by multispecies grazing through improved nutrient cycling.

Monteath et al. (1977) in New Zealand found that pastures containing mixtures of ryegrass, clover, and cocksfoot produced 9,728 kg/ha/yr for cattle and 12,447 kg/ha/yr for sheep. The decreased production of cattle pasture relative to sheep pasture was attributed in part to the heavier trampling by cattle. In addition, there was a greater loss of tiller population with cattle grazing which was reflected in a decreased rate of herbage growth and net production on cattle-grazed swards than on sheep-grazed swards (Hodgson et al. 1985).

Increased herbage growth and production through multispecies grazing is often associated with an increased intake per animal. If herbage growth is not affected, multispecies grazing may result in an increase in intake per

animal if the diets of particular species do not overlap completely. Generally, competition between animals of the same species is less when different species graze together.

Animal production can also be affected by multispecies grazing. Owensby (1988) reported that on native ranges in Texas sheep gained 10.2 kg/ha when grazed with cattle, compared to 6.9 kg/ha when grazed alone. Wool production per head was 3.1 kg/ha when sheep were grazed with cattle and 2.9 kg/ha when grazed alone. Percent lamb crop was also higher when sheep were grazed with cattle than when grazed alone (Taylor 1985). In other studies (Boswell and Cranshaw 1978), the rate of gain of sheep grazing with cattle was double that of sheep grazing alone. Berlin (1979) reported that lambs grazing with cattle had a dressing-out percentage 2.2 units better than lambs grazing alone. Skins of lambs with cattle had higher average scores and received higher prices than those grazed alone.



Cattle and sheep grazing together.

Cattle, on the other hand, appear to benefit less from multispecies grazing than sheep. Cattle performance in multispecies herds was in some cases similar or better than with single grazing, but in other studies it was worse. Where cattle performance was improved by multispecies grazing, the improvement was greater for sheep. Matthews and Foote (1987) found an 18% improvement for cattle and 55% for sheep. Where poorer cattle growth resulted from multispecies grazing, the increased sheep

liveweight gain has compensated for the decreased cattle performance.

The increased production of sheep over cattle from multispecies herds has been attributed to a variety of mechanisms. First, sheep compete less with cattle for resources than they do with other sheep. The ability of sheep to graze forage closer to the ground would certainly lead to better utilization of pasture by sheep than by cattle. This is particularly true when a higher ratio of sheep-to-cattle on pasture is used. Such a competition may be reduced on pastures containing a variety of forage species, such as trees which could be reached by cattle and not by sheep. Second, cattle grazing may help to maintain the nutritive value of sheep diets more effectively than grazing by sheep alone, since cattle graze at the sward surface and thereby improve the sheep's access to the lower surfaces.

Multispecies Grazing and the Control of Gastrointestinal Parasites

One motivation for considering multispecies grazing is the control of internal parasites. In multispecies herds the stocking rate for each species is lower, thus reducing the overall degree of contamination.

The cross-immunity between cattle and sheep is also a mechanism by which multispecies grazing helps control gastrointestinal parasites (Morley and Donald 1980). The intake by sheep of larvae from bovine origin is normally of little consequence because of host specificity. Also there is a beneficial aspect in that larvae consumption stimulates the immune response in sheep to challenge their own parasite species. Resistance was also found in cattle, though to a lesser extent, as a result of intake of larvae from ovine origin (Barger 1978). In either case, complete recovery from gastrointestinal parasites may not be expected through the grazing system alone. The use of anthelmintic drugs must also be considered for better control of the parasite problem, keeping in mind that the drugs may be more economical and effective when used in conjunction with multispecies grazing.

Other Advantages of Multispecies Grazing

It is possible that multispecies grazing may help control livestock losses which occur in nature and are unlikely to be prevented by other means. Natural predation, for example, could be alleviated by multispecies grazing because cattle may fight off coyotes and other predators.

Toxic plants are another cause of loss. Improved forage production resulting from multispecies grazing would discourage ingestion of toxic plants; animals would tend to eat the forages and ignore the less palatable toxic plants (Owensby 1988). In cases where palatable toxic plants such as immature larkspur or lupines are present, animals may eat as much of these plants as they do forages. Under multispecies grazing, the two animal species may react to toxic plants differently. Larkspur is highly toxic to cattle but not to sheep. By contrast, lupines are toxic to sheep but do very little or no damage to cattle. Such reactions would obviously tend to reduce toxicity

problems for both cattle and sheep, provided the stocking rate is correct.

Economically, multispecies grazing improves income stability by allowing the marketing of several products. Timing of sales to improve cash flow is important and more easily accomplished with multiple products.

Factors Affecting Multispecies Grazing by Cattle and Sheep

1. **Type of pasture.** As vegetation of pastures becomes more diverse, multispecies grazing tends to improve utilization.

2. **Stocking rate and cattle-to-sheep ratio.** Dickson and Frame (1980) compared performance of cattle and sheep grazing a mixture of ryegrass and white clover together in different ratios and at different stocking rates. Sheep were less sensitive to the stocking rate and exhibited a growth rate advantage at any stocking ratio. Cattle performance and total output per hectare were not markedly affected when lower numbers of cattle were involved at any stocking rate.

3. **Economic factors.** The price ratio between sheep and cattle products is important in assessing a multispecies grazing system. If the ratio is low, an all-cattle system is preferred; if high, an all-sheep system is better. In instances of equal market value of sheep and cattle products, multispecies grazing would create greater income stability.

Other Animal Combinations in Multispecies Grazing

In some areas, combination of sheep and goats can make good use of mixed grasses because of the low degree of dietary overlap (Squires 1981). Such a combination would spread grazing pressure more equitably between plant species than a mono-specific herd. No advantage of cross-immunity or parasite control has been observed in sheep/goat multispecies grazing, nor are predator losses alleviated with sheep/goat herds. Also, sheep and goats react similarly to toxic plants.

Summary and Conclusion

Cattle and sheep appear to be the most suitable species for multispecies grazing systems. The complementary association between the two species leads to better utilization of pastures, and higher resistance to adverse conditions such as predator loss, gastrointestinal parasites, and toxic plants. The extent of increase in animal performance depends largely on type of pasture and cattle-to-sheep ratio.

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Conservation Education on the Range

Carol A. Sirko

The education of children about conservation of natural resources has been an important goal of the Colorado Association of Soil Conservation Districts (CASCD) since 1950. CASCD is a not-for-profit, scientific and education organization which represents Colorado's 80 local soil conservation districts. A major policy goal of the group today is the promotion of conservation education. In the early '80s, the Association decided that, to have a lasting effect on conservation education, the educators must be enlightened.

Western State College in Gunnison was selected to provide a widely diverse setting for outdoor learning. Graduate credit is offered for those who enroll in the workshop. The first workshop took place in the summer of 1981.

Striving to focus on a new theme each year, the workshop has featured such topics as water quality, soil conservation, and forestry. In 1989, it focused on rangelands and



Successful classroom activities are presented by educators for educators.

the unique conservation problems on grasslands. Gunnison, Colorado, with its surrounding forests, Bureau of Land Management holdings, and privately owned ranches, provided the ideal surroundings to demonstrate these unique conditions. "Range-land . . . Its Many Uses" was a new topic to most of the 73 attendees in 1989. Resource personnel from the USDA Soil Conservation Service, Bureau of Land Management, Colorado and U.S. Forest Services, and the Colorado Division of Wildlife made presentations on wildlife management, recreation, ranching, and riparian management topics, including a tour of some well-managed range-

lands. Local rancher Ted Bemis discussed his system for planned grazing and rotation of pastures.

The workshop is all-inclusive in its three days. Participants hear from various specialists including landowners, consultants and specialists from government agencies. Displays from various agencies and handouts are available to the participants for use as curriculum supplements or catalysts in new areas of conservation. During the field trip on the second day, the participants see conservation practices, problems and solutions and get hands-on experience. Learning is doing. In the morning of the third day, it's peer to peer

Author is Executive Vice-President, CASCD, Lakewood, Colorado.

The Colorado Association of Soil Conservation Districts' Conservation Education Workshop for teachers, at Western State College in Gunnison, is a cooperative effort among state, federal, local and not-for-profit agencies. It has offered the challenge and thrill of hands-on learning and Graduate credit for 9 years. Of the statewide attendees, about two-thirds have been elementary educators.