Increasing economic pressure on Alberta livestock producers has put emphasis on what may be called "range efficiency". It may be defined as the peak forage or animal production per area of available rangeland. A major barrier to range efficiency, especially in the Alberta parklands and foothills regions, is the encroachment of trembling aspen, *Populus tremuloides*, onto otherwise productive fescue grassland. Demand has arisen for a relatively cheap solution to this problem; it appears that the use of cattle grazing in controlling woody species growth has potential as a suitable solution.

There are several disadvantages with the presence of aspen and other brush species on otherwise productive land. The first of these is a reduction of carrying capacity. These woody species take up land area which would otherwise be available for productive grass and forb species, and increased competition for light, moisture and nutrients further decreases the growth of the more productive species (Bodington 1973). The presence of many woody species, notably aspen and silverberry, *Elaeagnus commutata*, acts as a physical barrier to efficient cattle movement and grazing (Bailey 1970). This may make highly productive areas of the range difficult for cattle to reach. The presence of aspen on the thin black chernozemic soils of the region has been observed to cause soil deterioration. The acid leaf fall gradually degrades the soil to a gray luvisolic form, causing a decreased forage-producing potential (Moss 1932). Finally, it has been observed that undesirable plant species such as tall larkspur, *Delphinium glaucum*, may flourish in the under-story of the aspen forests which are expanding in these regions (Wroe et al. 1970). Tall larkspur is a poisonous plant which commonly causes decreased cattle productivity, if not mortality, particularly in the foothills region of the province.

Grazing itself does have a profound effect on the growth of woody species. Extensive grazing, as is typified by the common practise of continuous grazing, has been observed to actually promote the growth of most woody species (Matthews 1977) in a pasture. In a continuous grazing system, a lower stocking rate is maintained on the range for most of the growing season. If we look at any particular plot containing both unpalatable shrubs and valuable forage species, we may observe that it will only be grazed lightly 2 or 3 times over a period of several months throughout the growing season. In such a situation the woody species are ignored by the grazing cattle and only the forbs and grasses are defoliated, thus giving the shrubs a definite competitive edge and promoting their expansion in the plot. On the other hand, intensive grazing will inhibit the growth of woody species. Rotational grazing is typified by a very high stocking rate for short periods of time, repeated throughout the growing season. In this circumstance a certain area would be grazed heavily, defoliating both the woody species and the more productive grasses and forbs. Due to the poorer refoliation rates of most shrubs, the grasses and forbs would have the competitive advantage; this ultimately results in the suppression of woody species growth.

Grazing has also been looked at as a follow-up to the commonly used methods of brush management, namely mechanical, chemical and pyric. Mechanical brush management involves cutting down and piling shrubs and trees, and burning the dead timber. Often the area will then be cultivated, roots and stumps removed, and then reseeded with a suitable pasture seed mix. This method, although usually quite effective, is always extremely expensive. The aerial application of herbicides gives a very effective kill, although the most efficient chemical is currently not legally registered for uses. Another problem with this method of brush management is the standing dead timber must be further contended with.

Fire has been shown to be a relatively cheap and effective method of brush management, and is completely safe when the proper precautions have been taken. However, the major problem with pyric control of aspen invasion is common to the other two control methods; this is the occurrence of aspen regrowth. Trembling aspen has the property of extremely vigorous resuckering after a stand has been distributed. This may be such a problem that a given "improved" area, not subject to follow-up control, may be substantially reforested within 5 years.

A recent study by R.D. Fitzgerald at the University of Alberta, investigated the usefulness of cattle grazing in the control of aspen resuckering. An area of adjacent aspen grove and grassland was burned in May of 1979, and a pasture seed mixture was broadcast into the ashes. The area was then divided into several small paddocks and 2 grazing treatments were applied. The first was mid-June, or early, grazing and the second treatment was August or late grazing. In both cases a high enough stocking rate was used to completely remove all herbaceous material within 10 days. The results of this experiment encompassed two parameters, animal preference and effectiveness of brush regrowth control. In the early-grazed paddocks it was observed that the cattle first utilized the herbage in the grassland portion, and began grazing the aspen leaves only when all other herbaceous material had been removed. However, in the late grazing treatment the cattle actually preferred the aspen sucker leaves over the more mature grasses. Thus the conclusion

Based on a presentation in the University Student Conclave session at the 1982 SRM Meeting in Calgary, Alta. The author is from Balzac, Alta.
was reached that cattle will graze aspen in the latter part of the growing season.

The observations regarding the effectiveness of brush control were made in the spring of 1980. The aspen in the early-grazed paddocks had resuckered quite vigorously, and made up a large proportion of the total plant material in the paddock. The August-grazed paddock, however, contained very few aspen suckers the following spring; grazing the suckers late in the summer inhibited their spring regrowth. It was observed that the growth of all woody species except snowberry, Symphoricarpos occidentalis, was suppressed as well, while the more productive grasses and forbs were growing quite well.

Although it was not determined if cattle production was affected in this test, some very important conclusions were made. These are:

1. That cattle will consume trembling aspen leaves readily, particularly in late summer when the more mature grasses are less palatable.
2. That late summer grazing (or defoliation) of trembling aspen will inhibit vegetative sucker regrowth in the next growing season.

Apparently, the use of cattle for controlling the expansion of woody species on Alberta grasslands does have potential. Proper grazing strategies may be used to inhibit or control the growth of many woody species, in order that these rangelands may reach their maximum forage-producing potential. The major obstacles to the use of these methods for maximizing "range efficiency" are the infrequency of dissemination of this type of useful test data, and the apparent unwillingness of some range managers to use more labor-intensive management techniques.

References Cited


