SEEDED FORAGE CROPS - THEIR MANAGEMENT AND PRODUCTIVITY

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This paper will discuss seeded perennial forage crops within the confines of the Brown Soil Zone. Certain of the principles may have application to other areas but there is no intention to imply the transportability of such.

Any seeded perennial forage, whether it is used for pasture or for hay, should not only be compared to other crops but it should also be compared to the productivity and usefulness of the native vegetation in the region.

The native vegetation in the Brown Soil Zone is primarily composed of the short and mid grass complex including certain forbs and shrubs but virtually no trees except in coulees, valleys and along water channels of creeks and rivers. The D. M. productivity of edible and useful forage, although ranging from less than 100 kg/ha to perhaps 1,500 kg/ha in meadows, has been generally accepted as averaging about 300 kg/ha of which only about 60 percent is or should be harvested. This means that something less than 200 kg/ha from native rangeland is used annually to provide about 17 kg/ha of live weight animal gain.

Alternately, this same region can and does produce quintal/ha (20 bu/wheat/acre on summerfallowed cropland. This equates 6 q/ha (10 bu/acre on the overall land base which in turn (using 1:1 straw to grain ratio) is a total plant D. M. yield that is 4 to 6 times greater than the 200 to 300 kg/ha from native grass. Small wonder that most of the manageable native sod cover was broken out and is now used for the

production of grain compared to the meagre 17 kg/ha of animal gain.

Grain, however, is not meat. We can accept and even add lip-service to support the fact that meat production is a poor and inefficient process of converting plant material to human food. But, unless there is a radical change in human behavior we will remain in the paradoxical position of saying one thing between meals and eating roast beef and steak after work. And who can stand a steady day-to-day diet of turkey "the great 1:1 converter?"

Perennial forage crops used in the region under discussion must not only outstrip the native vegetation in animal production but it must compete favourably with the economic returns obtainable from grain production. We should be big enough and fair enough to largely ignore the current short run inequity which exists between the grain and meat industries. Would it be reasonable to consider that the long run price of grain might be 4¢ to 5¢ a lb, forage 1 1/2 to 2 ¢ a lb and feeder calves 55¢ with butcher cattle 45¢? If we accept these bench mark values let us look at what perennial forage crops can and are doing in the Brown Soil Zone.

There are numerous producers in the southwest who are obtaining in excess of 112 kg/ha (100 pounds/acre) of annual liveweight gain during the pasture season. That level of production equates to $135.85 per hectare ($55/acre) based on 55¢ calves. At the same time they are producing 6 quintals (10 bu/acre) of wheat which is worth $2.50 to $3.00 a bushel, which equates to as much as $75/ha ($30/acre).

However, to be fair again, we must consider wintering the cow herd which will require up to 1400 kg (3000 lb) of roughage and hay. This will require the productivity from an additional hectare (2+acres). So in reality it will take 2.8 hectare (7 acres) of land base to produce a total calf gain of 135 kg (300 lb). Therefore, the land base gross production value for a cattle enterprise will be near $26/acre and not $55 an acre. The two values; $30 from wheat and $26 from cattle, are pretty close and how they really compare depends on the cost differential, if in fact there is one and in which direction the differential points. If the roughage portion of that 3000 lbs of winter feed is comprised of straw from harvested grain fields then the land base for a calf crop would be easily reduced to 6 acres instead of 7 acres as previously mentioned. This alone increases the gross productivity value of forage stands to the same $30 level for wheat at $3 a bushel.

So much for comparative assessments. How are seeded forage crops managed to produce 100+lbs of live weight production per acre? There are really no short cuts in maximizing meat production any more than there are short cuts in maximizing grain production. As in grain production, we must accept the necessities for sound crop choices, seed bed provisions, weed control, timeliness of use or harvesting and others that may not pertain to grain.

Crop choice is not a major problem as the numbers of crops and varieties within which are adaptable to various soil conditions

within the region are relatively few. The limitations and suitability of each crop have been quite accurately determined. Thus bromegrass is not a Brown Soil Zone crop, nor is Russian wild ryegrass a good haycrop, nor is crested wheatgrass the best pasture grass, nor are Vernal or a blend of alfalfas good persistors. This is elementary stuff, or should be to research and extension people who act in advisory capacities to producers. Alfalfa should comprise the legume component in nearly all simple mixtures. A mixture should, with few exceptions, be ultra-simple to the point of containing only one specified grass with one chosen alfalfa variety. It has to be designed to fit a particular condition for a particular use. All the management and manipulation in the world is not going to maximize production if the crop is ill-chosen in the first place.

Weed competition is not endured in an ideal grain producing enterprise so why should it be otherwise in a forage-cattle enterprise. Good forage producers essentially eliminate weeds prior to and during initial establishment of the crop. This is done by pre-seeding cultivation and herbicide spraying. Russian thistles in themselves are not a serious weed. In fact, a thin to moderate stand of Russian thistles during the establishment year can actually enhance a forage stand. They provide some shade and ground cover protection against erosion and wind damage during the seeding year. Subsequently, they act as an excellent snow-trap during the first winter.

On the other hand, late fall or pre-emergence spraying for the eradication of winter annual weeds is imperative. Flixweed, stinkweed and perhaps peppergrass, simply cannot be tolerated in establishing forage crops. They are readily and easily controlled with 6 oz of 2,4-D. Failure to spray for these weeds is tantamount to not seeding the forage at worst or to introducing a three year delay in forage production at best.

Good weed control is of further vital importance when the concept of optimum plant population and inter-row spacing is introduced as a design tool towards maximizing sustained production for years ahead. It has been determined that maximum yields from a stand of perennial forage plants will be obtained from equally spaced plants which are about a foot apart. This, of course, is 43,560 plants per acre. However, we cannot achieve such a uniform distribution with conventional seeding equipment. So we compromise by seeding as thinly as possible within rows which are spaced two feet apart. Where topography or soil type, or both, are conducive to soil erosion the fields can and are being cross-seeded in two directions. In these instances the spacings between the rows should be three feet which is equivalent to 18 inches if seeded in one direction only.

Early, initial care is the most important management decision that the producer will face during the lifetime of the forage stand. In that first year he has controlled the weeds and established the crop. In the second year he is into his first harvest year. If it's hay there will be no problem since the plants will have a two month

period to develop crown growth and stool out to physiological maturity. On the other hand, if it is a stand intended for use as pasture, the most common mistake made is to stock it too early in that first season and thereby deprive the plants of natural growth development. Grazing should be deferred in that first use year to about mid-June, by which time the plants have essentially made most of their seasons growth. In fact, the field will provide more pasture in that first year by delaying use until mid-June than it would if used earlier. Thereafter, grazing can commence as soon as growth commences in the spring, providing a sensible stocking rate has been determined.

Well established fields of Russian wild ryegrass - alfalfa mixtures seeded in two foot spaced rows are being stocked at the rate of one cow and calf for each two to four acres, depending on soil type. This is giving 300 lbs of calf gain or from 150 to 75 lbs per acre.

To this point little has been said about perennial forage hay crops. In the brown soils, no grass to the present, will out yield crested wheatgrass and no legume will touch alfalfa. We have traditionally accepted 3/4 ton as the long term average annual yield from a mixture of these two when seeded in 12 inch spaced rows.

A decade or more of trials has opened up new possibilities. Separating the grass and legume components and increasing the row spacings have made significant contributions to much improved yields. If crested wheatgrass and alfalfa are seeded in alternate rows

spaced 18 to 24 inches apart average annual yields will be very nearly 1 1/4 tons. In very favourable years (about one in ten) the alternate row stands will yield only 10 percent more than the same crops in mixed rows. In average years they will yield 25 percent more, but in very dry years they have yielded more than 200 percent more.

Hay sources for wintering livestock have a much broader base than have sources for seasonal pasture. Fall rye or spring seeded oats provide reliable sources of supplemental winter hay, cereal crop straw residue also supplements roughage requirements. These cereal crops should not be the sole source for winter feed. The primary source should be perennial forage crops. The cereal crops should play the back-up or insurance role in a cattle production enterprise.