GOAL SHOULD BE HIGHER

Major factors of low yield quality in growing forage

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While a selected few of our Maritime farmers are doing a reasonably good job of forage production, the majority are not and herein, along with inadequate grain production, lies the greatest dilemma of research, extension and farming in the Maritime provinces. Over 80 per cent of our farm cash income comes from our forage-livestock economy and almost 70 per cent of our improved land area is involved in it. If our bootstrap operation of self improvement is to feature increased production of meat and milk to the point where we can at least feed ourselves, then it all has to start with more efficient and much higher production of forage crops and cereal grains.

Can we produce as much forage per acre as economically as they can in Ontario, or in Maine, with whom we tend to compare ourselves? We certainly can't and don't at the present time. Whether we can in the future remains to be seen but if we do I doubt if we can do it as economically. I say this not to be pessimistic but to try and be factual. We have some basic limiting factors that they do not have and we may as well accept them and start from there to overcome them. However, our potential yield is at least twice the present provincial average yields for most forage crops and probably as much as ¼ to one-third greater than our good farmers are getting now. The 1961-62 average "tame hay" yields according to the cnseus are 1.76 tons per acre for P.E.I., 1.92 for New Brunswick and 2.12 for Nova Scotia. Our goals should be at least five to six tons of hay per acre and more if possible on our better farm lands and an acceptable average yield would be 3.5 to four tons per acre. Increasing our forage yields means in effect overcoming the limitations that are presently preventing production from becoming maximum. What factors limit yield and quality? In my opinion there are three groups, each of which is very important. In the first group are agronomi factors; in the second financial factors; and in the third are social factors— including educational and traditional aspects. These three groups are all interrelated. I will discuss each of the major ones briefly.

SOIL ACIDITY

The most familiar of these agronomic factors are undoubtedly soil acidity and low native fertility. These shouldn't be limiting our yields now since liming and fertilization will correct them and we all know this or have been told often enough. Liming is one topic on which we have conducted a lot of research. We have shown that mixing it in is better than surface application, but that both are effective. We know that soils limed to a pH of 6.2 to 6.5 and fertilized adequately produce maximum yields.

Work at Kentville and Charlottetown indicate 5.5 to 6.0 is adequate and frankly I agree with this for some crops. Our research has shown that aluminum and soluble aluminum is our problem, not hydrogenions. This explains why a pH of 5.5 is such a magic figure. Simply because above this the aluminum is precipitated out and is inactive. Soluble aluminum is toxic to legumes and cereals such as barley. It inhibits root development causing a shallow and restricted root system that cannot get moisture as nutrients as effectively as normal root development. If a farmer wants to lime to pH 7.0 for seeding down alfalfa that is fine by me, but not at the expense of the rest of his farm. Lime is most efficiently used to bring the pH above 5.5 if the soil is very acid or if the farm is at pH 5-0 thenproceed to raise it to 6.0.

Fifty tons of lime will increase the pH of 20 acres to 5.5-5.8, 12 acres to 6.0- 6.2 and from three to five acres at pH 7.0 depending on texture and of course on the initial pH. Capital investment per year calculated on a 10 year basis and including a .40 per acre annual maintenance charge would be $1.10, $2.00, $3.-25 and $5.00 forthe 5.5, 6.0, 6.5 and 7.0 pH values respectively. (Table 1). All are profitable investments but which could you sell to the farmer. I'd try to sell the $2.00 one myself as a starter. The increased yields due to this initial investment in lime will pay for all future applications. Even if you calculate lime costs at $5.00 per ton spread by truck the investment is still very profitable at $1.80, $3.60, $5.90 and $9.60 per acre per year.

Fertilizer is most efficient and profitable on soils that have been limed up to the lime requirement of a particular crop. (Fig. 4). By lime requirement I don't mean pH 7.0 as suggested by soil test report sheets. Why do we continue to confuse farmers by reporting a pH of 6.5 and a lime requirement of two tons per acre for example? While this is a matter under provincial jurisdiction I feel the present lime requirement figure should be stricken from the report and only the rate of lime until we shake this tradition or path of least resistance. Only seeded to extend the haying season is it at all acceptable. An early first cut as silage or hay insures quality forage in the first cut and allows for a potentially high yield of second cut. It utilizes moisture more efficiently, gives higher yields and allows a good second cut to be removed in late August.

If there is a golden rule for forage management I think it would go as follows. Fertilize in early spring, cut in late June, fertilize and cut in late August and help the plant prepare for the long cold winter ahead. Early cutting is the key to forage quality.

Winter killing of legumes puts an element of chance in our forage program and boosts production costs considerably. Loss of the legume means we must invest up to $20 per acre in nitrogen fertilizer and that we will have to reseed sooner than anticipated. Both of these are expensive alternatives. We cannot rely on pure legume stands and tend to favor simple mixtures of one grass and one legume mixed with some fields of pure grass and some pure legume.

Some of our pitfalls in preventing winterkilling are:

1. Careless fall management — a man who grazes his alfalfa between August 30th and mid-October is asking for trouble.
2. Inadequate fertilization which will always result in a starvation diet in the fall just when the plant should be well fed. If we can't increase spring and summer fertilization enough then let's promote September 1st fertilization with potassium and or with a low nitrogen high potassium fertilizer. The best place for nitrogen in the spring is in the plant ready to produce growth. Then cold soil temperature won't prevent its uptake.
3. Wise selection of winter hardy species and reeding and selection to this end.
4. Attention to drainage and— or levelling of the land used for legume production—both surface drainage and tile drainage where necessary.

HARVESTING SYSTEMS

Next to time of cutting weather conditions and speed of harvesting have the greatest influence on forage quality. We can produce high yields of good quality forage but if it cannot be preserved to hold this quality than we have lost a lot in our investment.

Unfortunately there has been more complaining about forage preservation than there has been research to overcome it. Good work has been initiated provincially and it appears that it will be reinforced federally but we still haven't any reason to sit back and be proud. In fact the best thing I can do with this topic is to acknowledge its importance and to move on knowing that harvesting and preservation will figure prominently in the discussion.

Nothing will ever compensate for a poorly established and weak forage stand. We suffer more from this shortcoming in the Maritimes than we realize and then attach the blame to winterkilling, inadequate fertility, etc. We have to face this limiting factor squarely and invest in lime, fertilizer, machinery and good seed before we shed forages.

This should be classed with factors that we can and must improve. The cost of reseeding can range from $25 to $35 per acre. Just think, this is more than what I wanted for annual fertilization costs to maintain a 5-ton yield of legume or mixed hay. Besides these additional seeding costs, the seeding year yield will be much smaller and you will lose two ways.

We can choose whether weeds or cereal crops will compete with forage seedling. To kill weeds costs money and the dividends must come from better forage establishment. A cereal companion crop will provide an energy feed on the seeding year, but will it make up for the loss of yield in subsequent forage crops? I am not going to support one or the other but will assume we will have both to contend with.

How can we improve each? By supplying adequate fertility for both the grain and forage crop and by fertilizing high nitrogen, potassium if a grass, and high potassium if a legume or a mixture, after removal of the grain crop to give the forage seeding a boost before winter. Our fertilizer recommendations are inadequate in this regard and so are our forage management recommendations.

For straight forage seeding seed early and fertilize adequately and spray to make the seeding year a harvest year as well. Use high phosphorus fertilizers regardless of which system you choose. Normally productive species used in the wrong environments are a limiting factor.

Greater use of alfalfa and bromegrass or light textured soils having limited moisture reserves; selection of a range of maturity for timothy for example to lengthen the harvest season; greater use of birdsfoot trefoil where adapted and management of each species according to its physiology are examples of overcoming the limitations this factor may have on potential yield.

Let me mention briefly some social and financial factors which limit forage yield and quality. Under social we could include:

SOCIAL FACTORS

1. Tradition - - for example reluctance to change from "the one late cut poor quality hay system" since it is easy to make and the weather is better in July than in June.
2. Reluctance to acknowledge that forage is a valuable crop and must be treated as a separate crop and requires lime, fertilizer and machinery investment. Research, extension and farming people are all guilty of this to varying derees.
3. We are not getting across completely enough the importance of quality. Digestible dry matter rather than dry matter must be our measuring stick and our every day terminology.
4. Age of farmer, father - son relationship and attractiveness of farming as a profession for educated young men all affect production levels. Only farmer education to provide people receptive to extension efforts, printed or televised, recommendations and who understand that it takes money to make money can improve this factor.

SOIL TEMPERATURE

The low temperature characteristic of May and early June in the Maritimes is an unfavourable part of our heritage and one which causes numerous disadvantages. The importance of soil temperature has been overlooked and not at all well understood. When soil temperature is below 55 degrees F. there is only limited microbial activity, little or no nitrification and little or no release of nitrogen and phosporous from organic matter breakdown. At 55 degrees F and below it has been shown that roots do not function nearly as well as at temperatures above 58 degrees F. In short we need soil temperatures above 58 degrees for active growth.

What can we do about it? We can fertilize all hay crops (grasses and legumes both) with a fertilizer containing nitrogen and phosphorus to compensate for what is not yet available from the soil. This practice will give forages an earlier start and a higher yield in the first cut. We can't control the soil temperature but we can try to compensate for it with fertilizer. Adequate nitrogen and potassium in the plants going into the winter is also an obvious advantage.

SOIL MOISTURE

Moisture may be limiting down to depths of at least 18" to 24" in July and August in three out of five years. We could irrigate but the economics of this through proper management and we can use deep rooted species to go down after this water. A knowledge of soil moisture in relation to cutting management may explain slow recovery of shallow- rooted grasses and legumes in comparison to the more rapid recovery of alfalfa and bromegrass which are deeper rooted. Proper selection of species for specific soil types and fields would help to vercome moisture limitations.

CUTTING MANAGEMENT

Hay cut in mid to late July is, next to inadequate fertilization, the factor most responsible for low yield and is the greatest contributor toward poor quality hay. It is the greatest curse characteristic of marginal to average farmers. We will never reach our potential yield levels needed for barley, or for timothy or for an alfalfa- brome mixture be shown.

Soil acidity should not limit forage yield and probably isn't as serious now with our better farmers.

SOIL FERTILITY

Fertilization of the majority of our forage crops is almost low enough to be soil robbery rather than forage fetilization. I submit that our recommendations are geared to a level slightly above the present average yields of just over two tons per acre. If our goal is five tons of hay per acre than we may as well accept the fact that forage is a valuable crop (from $125 to $175 per acre depending on the value attached to it) and fertilize it accordingly.

In round figures a five ton hay crop will remove 300 pounds of N, 30 pounds of P and at least 200 pounds of K. This is equivalent to 900 pounds of ammonium nitrate, 350 pounds of superphosphate and 400 pounds of muriate of potash. At present prices of N at 15 cents lb., P at 34 cents lb. and K at six cents lb. this represents the removal of $67.00 worth of fertilizer. To engage in some loose figuring, let's assume that the soil, fertilized only on the preceding cash or grain crop, could "eke" out a 1.5 ton hay crop. Consider that this is approximately the contribution of the soil— a sort of a soil mortage— and substract the $17.00 worth of fertility from the produce say $150 worth of hay. This leaves $50 per acre for fertilizer that will produce say $150 worth of hay. For legume and legume-grass hays the fertilization costs would be cut in half since they supply their own nitrogen.

High yields are simply not attainable without sizeable investments in fertilizer. We need to establish economic levels but this cannot be cut and dried without being ited in with the whole operation. Dr. Poulton says good hay in Maine is worth $35 to $40 per ton. That is for $5.00 milk. What is it worth for $3.50 milk on P.E.I.?

Fertility is another factor we can control.

DISEASES, INSECTS

The most significant statement I can say here is that we don't really know how much of a limiting factor it is. Finally we do have research people working on this aspect and I think it is about time. We now know that Sclerotinia and other root rots have made red clover a biennial instead of a perennial. We do not know to what degree winterkilling is due to root rots, nematodes or fungi such as Furorium. Any disease or insect which cuts down the photosynthetic efficiency of the plant (i.e. leaf drop, leaf yellows, rusts, etc.) reduces the potential yield and makes the fertilizer and lzbor investment less economical. The interrelationship of pathology, nutrition, management, physiology, etc. is a wide open field and is one we have to get down to business on right away.

FINANCIAL FACTORS

Everything gets back to money sooner or later and finances can put a damper on enthusiasm for forage production. A considerable investment is required for seed, lime, fertilizer machinery for harvesting and machinery for curing and feeding. Without this investment there is no hope of high yields of quality forage.

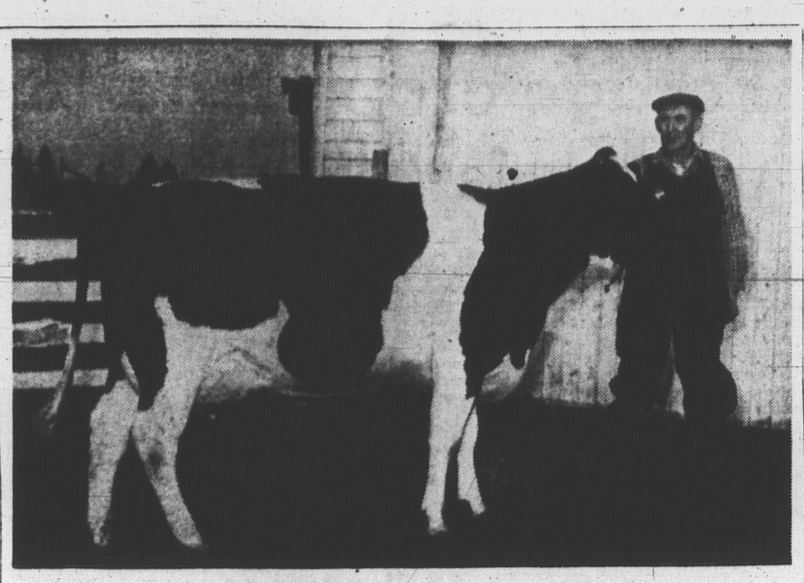
While I don't plan to get involved in economics I do believe that all our recommendations to farmers to fertilize, buy conditioners, barn driers, etc. while we feel they are correct, have caused the greatest quandary in the farmer's mind that he faces today. It is a major decision and one in which we must have competent counselling and advice. Many farmers who have borrowed for capital investment are making a success of it and expanding their operation. We will have to encourage it even more. This is the field of an economist and and out of my bailiwick.

I fell that research objectives in themselves cannot be limited to economics but that economics must be applied to research findings.

I am well aware of the financial burden put on the farmers and am most sympathetic with their dilemma. Sympathy, unfortunately, will not increase their yields. Guidance, good advice, fertilizer, implementation of our knowledge and research findings will result in higher yields of good quality forage.

The following are 10 guidelines to productive forage in the Maritimes:

1. Use versatility in selection of species including corn or supplementary pastures.
2. Use simple mixtures of species that grow well together.
3. Fertility and management are important in the seeding year for good seeding establishment. Know each species and manage it accordingly.
4. Apply lime as required and invest generously in fertilizer.
5. Promote early cutting of the first crop followed by fertilization.
6. Cut the second crop before September 1, to allow regrowth and storage of food reserves for the development of cold hardiness and winter survival.
7. Cut early for high digestibility and quality (June and late August are recommended cutting times.)
8. Use nitrogen liberally (up to 100 lb. per cut) but avoid lodging and accumulation of non-protein nitrogen in the forage. Keep pace with potassium as nitrogen fertilization is increased.
9. Make the most efficient use of the available soil moisture by seeding some deep-rooted species and by taking the first cut off early (June).
10. Keep plants in a good state of fertility and properly managed after September 1st to give them every possible chance to survive the winter. Remember it is cheaper to fertilize and provide alternate grazing for one month than it is to plough and reseed a new forage stand



DAUGHTER OF FAMOUS SIRE

This Holstein cow in the stable of Lewis Brothers, York, is a daughter of Rosafe Citation R. one of the best known sires of the present time. His get have won top place at the Royal Winter Fair and at several other major livestock shows. He is owned now in Mexico. Lewis Brothers purchased this cow at a dispersal sale of Holstein cows in Ontario last year. Ben Schmaltz, is at the halter.

Million $ cheese market available

Agriculture Minister J. J. Greene recently urged the cheese industry to take full advantage of the new million dollar market opportunities in the United States.

The U. S. quota for cheddar cheese from Canada has been raised by 200,000 pounds for the period ending June 30 and will be raised in 1966-67 from the current 600,000 to 3,000,000 pounds This could mean raising the dollar value of cheese exports to the U. S. from $280,000 in 1965 to $1.2 million.

Mr. Greene said the announcement from the U. S. was a recent visit by members of the Canadian Cabinet to Washington.

The U. S. Agriculture Secretary Orville Freeman had promised to raise the quota as soon as possible and Mr. Greene said he was most pleased that Mr. Freeman had acted so quickly.

The Minister added: "I believe that we can easily fill any new quota assigned us for cheddar cheese, including all of the new proposed special quota for 1.2 million pounds of aged cheddar."

SPECIAL QUOTA

The new U. S. quotas for 1966-67, commencing July 1, will permit Canada to export 1.8 million pounds of cheddar and to share in the new special quota of 1.2 million pounds of aged cheddar. Mr. Greene said industry represenatives believe there are ample stocks of cheese on hand at various stages of maturity and they are confident they can fill any new orders.

Also, because of Canada's world-wide reputation for aged cheddar a produce of unpasteurized milk from grass-fed cows this country would be in a preferred position to take most, if not all, of the new quota for this type.

Mr. Greene said the new quotas indicated that Canada can export three million pounds of cheddar in the new U. S. quota year beginning July 1. He pointed out that the maximum exported to the U. S. in recent years was 1.5 million pounds in 1952, just before the quota was cut back sharply.

In 1965 U. K. took $11 million worth of Canadian cheddar - 29 .3 million pounds out of 31.6 million pounds exported; in 1964 U. K. took 29.3 and in 1963 24.4 million pounds. During these years, and since 1953, exports to the U. S. were limited to approximately 600,000 pounds.

STEADY INCREASE

Canadian production and consumption of cheddar have been steadily increasing. Recent output figures (consumption in brackets) are: 150 million pounds (117 million) in 1965; 143.6 million pounds (112.5 million) in 1964; and 139.3 million pounds (107.8 million) in 1963.

A century ago Canada used to import large quantities of cheese from the United States.

By 1904 Canada was exporting to the United Kingdom more than 200 million pounds annually. During the emergence of low-cost suppliers to the British market - notably New Zealand - Canadian exports began to fall. They went from 150 million pounds in the mid-1920's to about 46 million pounds in 1936. War needs boosted cheese exports to the U. K. to 120 million pounds annually but postwar shortage of dollar funds in Britain found the trade reduced to a trickle of 5 million pounds by 1954.

Chief value of the increased U. S. quota is to provide first a broader outlet for present production, and secondly, a further incentive to increased production under the encouragement provided by the new Canadian dairy policy.

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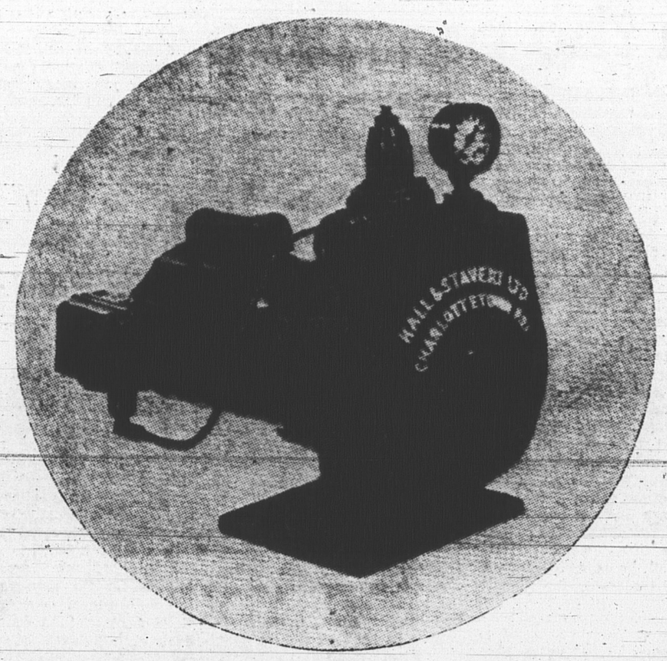

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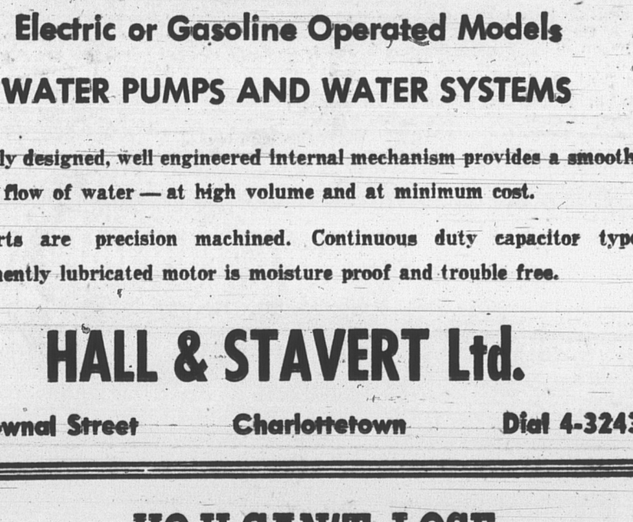

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