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The Horse Breeders' Lien Act.

There is in Manitoba a statute entitled the Horse Breeders' Lien Act, calculated as a protection to the farmer, in that the Provincial Government certificate is a guarantee that the stallion bearing it is duly registered in a recognized studbook of the breed to which he belongs; and to the stallion owner, in affording him an opportunity to legally protect his claims for service fees by obtaining through a very inexpensive process a lien of the colt until such claims are satisfied. Such a protective measure for the owner of a stallion should prove a great benefit to the country by encouraging the use of a higher class of stallions, through the protection thus afforded to the capital invested in valuable animals, and in encouraging the use by farmers of pedigreed horses only.

The Act is not, however, taken advantage of as generally as it might be, as the fact of its being on the statutes serves of itself a decided protection to the stallion owner; yet, the farmer should demand his share of the protection by insisting on the guarantee of registration. A recently-inserted amendment to the Act is worthy of special attention in this connection. The original registration fee, payable to the Department, is \$5, but "in the case of a sale or transfer of a stallion once so registered, the new owner, upon filing proof of such sale or transfer to him and, if required, surrendering the original certificate, shall be entitled to a new certificate of registration upon payment of the sum of one dollar." Copies of the Act and also printed forms of statutory declaration, upon which to enter liens against foals, under provisions of the Act, may be had on application to the Department of Agriculture, Winnipeg.

It has been suggested that this Act might go further in the way of protecting the farmer by providing that the certificate should not be granted by the Department unless a qualified veterinarian's certificate guaranteeing the horse free from hereditary unsoundness accompany the studbook certificate. There is no question but that pedigreed stallions with hereditary unsoundnesses are a greater injury to the horse-breeding interests than

sound, clean stallions that may not be eligible to record in any recognized studbook. A discussion on this point in our columns would likely be conducive to good results. The Act at present does not recognize the American Clydesdale Studbook; this is surely an omission that should be rectified.

This subject is a timely one for horse-breeders to consider, not only in Manitoba, but, perhaps, more especially in other provinces of the Dominion, where no such legislation exists.

Sugar Beets in Michigan.

[Written for the FARMER'S ADVOCATE, by J. J. Ferguson, Instructor in Animal Husbandry, State College, Mich.; an Eastern Ontario farmer's son; graduate of the Agricultural College, Guelph, and a former successful Institute worker in Ontario and Maritime Provinces.]

I have noted with much interest the progress of the movement towards the establishment of the beet-sugar industry in Canada. During the last few years, probably greater strides have been made along this line in Michigan than in any other similar area in the world. Since our State College has been very intimately in touch with the work since its inception, I gladly comply with the request for a few notes on the business in general.

There has been much both of success and failure in the experience of those who have raised beets for the factory in this State. Everyone cannot make a success the first season; soil, season and cultivation must all be favorable; on the most suitable soils, and with the best of cultivation, in many cases the crop lost money to the growers a year ago, owing to the extremely light rainfall.

Last season there were in operation in the State no less than ten factories, with a total production estimated at fifty million pounds of sugar. The first factory was built in 1898 at Bay City, by the Michigan Sugar Co., at a cost of \$350,000. The capacity of this factory has since been largely increased. The cost of the factories since built has been about half a million dollars each. The capacity of a factory is usually rated at a ton of beets for every thousand dollars of capital, so that most of the factories can handle about 500 tons of beets per day. But one factory has been forced to make an assignment, that at Benton Harbor; this was due, not to lack of profit in the business, but to the fact that it was built in the heart of one of the finest fruit sections on the continent, where land sells for \$150 per acre. There was more money in fruit and vegetables for the Chicago market, so the farmers declined to grow beets.

The period during which the factories are in actual operation, technically known as the campaign, is comparatively short, averaging usually one hundred days, and commencing about Oct. 15th, or whenever the beets are ripe, depending on the season. The product of the Michigan factories, we understand, is not handled by the National Sugar Trust, but goes direct to the wholesalers through the medium of a sales board. The quality of the product is beyond question, samples received at the College chemical laboratory showing only about one one-hundredth per cent. impurity. The process of manufacture is an intricate chemical one, entirely beyond the province of this article.

The phase of this question in which the average reader will take most interest is the matter of the proper soil and culture essential to a good crop of beets. We shall give briefly a few of the facts arrived at up to the present.

THE SOIL.

While it is true that beets will give large returns on a variety of soils in favorable seasons, the per cent. of sugar, one of the most important factors, varies in direct relation to the different soils. The ideal soil is clay loam, and next in order loam and sandy loam. Experiments conducted on the humus soils of this station show that while the yield of beets may be large, there is too much growth of crowns and leaves, and, what is most important, the per cent. of sugar from beets so grown is too low, often three or four per cent. below what is on tracts of clay loam similarly treated. This has been the great difficulty met by the Illinois Sugar Co.; the soils of that State are unusually rich in humus; the average of all beets handled at their factory one season was only 10.2 of sugar. This season the beets handled by one Michigan factory averaged about 4 higher than this, showing a good margin for both the producer and manufacturer.

PREPARATION OF THE SOIL.

The great essential is to secure an even seed-bed in fine tilth. Fall plowing has given best results, followed by thorough surface-working so soon as the land becomes loose and friable in the spring. A clay loam underlaid by a hard clay subsoil is greatly improved by the use of the subsoiler, since the fine rootlets must go down deep for moisture in dry weather. If forced to feed near the surface, rough beets with many scraggy rootlets will be the result.

AS TO VARIETIES.

It is never safe to speak with any degree of assurance on this point, when we remember probable soil and climatic differences between sections of country more or less remote. Vilmarin Improved, which has given such good results in co-operative tests in Ontario, has been, all things considered, the most satisfactory cropper in this State, with regard to yield and sugar content. The following table gives the results with the three leading varieties tested season of 1899, which was a very unfavorable

one. Much better results might ordinarily be expected:

NAME OF VARIETY.	Yield per Acre, pounds	Per cent. Sugar.	Purity.
Zehringen.....	10,283	14.00	80.60
Kleinwanzlebener.....	10,619	13.64	78.50
Vilmarin Improved.....	12,020	12.80	79.10

TIME AND MANNER OF SOWING.

The time will depend entirely upon locality and season; in general, the earlier the sowing the longer will be the season of growth. With us, best results have been secured from sowing in flat drills 20 to 22 inches apart. It is wisdom to use plenty of seed, probably eight pounds per acre. We heard one grower state recently that he had used 15 lbs., but we think the extra seed practically wasted, besides increased labor in thinning.

FERTILIZERS.

Perhaps, in general, the best results have been secured from the application of well-rotted stable manure the previous autumn. Without a liberal supply of available nitrogen, phosphoric acid and potash, profitable crops cannot be grown. Lacking a supply of stable manure, commercial fertilizers must be resorted to. An excess of nitrogenous fertilizer tends to produce large beets with a diminished sugar content. The application of fresh stable manure produces ill-shaped beets with a large growth of small rootlets. Whatever fertilizer is used, it should be rich in potash and phosphoric acid rather than nitrogen. Our Agriculturist, Prof. Towar, prescribed the following for an average soil:

Nitrate of potash.....	100 pounds
Sodium nitrate.....	100 " per acre.
Available phos. acid (any source).....	30 "

The fertilizer is best applied broadcast, a few days before sowing the seed. There is practically no definite information available regarding the effect of different fertilizing elements upon the sugar content of the beets. It is always well to experiment on a small scale with even the best of commercial fertilizers, as their lavish or ill-timed use may easily result in a positive loss—a word to the wise.

THINNING AND SUBSEQUENT CULTIVATION.

The weeder should be put to work almost as soon as the sowing is finished. Thinning will be possible in from fourteen to twenty days after sowing; the rule is to commence before the fourth leaf appears, but it would be unsafe to delay for this with a large acreage and a season of rapid growth. For 20-inch drills the beets should be thinned to 8 inches; with drills 22 inches apart, 7 inches. We have no data available as to the effect of wide or close thinning upon the sugar content. After thinning, the great object is to keep the surface soil in fine tilth and free from weeds. Special cultivators are made for this purpose, which take care of two rows at a time and almost entirely do away with hand labor. As the season advances, the cultivation should become shallower and narrower between the rows. The drier the season, the longer the period of cultivation.

WHEN TO HARVEST.

The time varies greatly, depending on date of sowing, temperature and rainfall. The factories have men whose business it is to keep close watch upon the growing crop, and at intervals to take samples for analysis. The best external test is seen in the yellowing of the leaves. Many farmers, owing to their fear of early frosts, have commenced harvesting before the beets were fully ripe, and have thereby suffered a loss of one or two per cent. of sugar.

HOW TO HARVEST.

Any way, so long as you get them out. Hand-pulling is too slow and too hard work. The station last season used a beet-harvester, costing twelve dollars, a tool drawn by two horses. It has two hoes running along on each side, and below the beets. This leaves the ground in such a condition that all that is necessary practically is to lift the beet. There is a great difference as to the way different varieties of beets root and the effect of different soils and cultivation along this line. The properly-grown beet has but a very small crown above the surface of the ground. The per cent. of sugar is much less in the part of the root exposed to the action of air and sun. Many growers have tried cutting the tops off with a hoe, but at best this makes an untidy work, and the saving in handling is not profitable, since the more the beets are handled the less will be the dirt adhering. Topping is best done after the beets are pulled, by means of a knife specially made for the purpose. The crowns should be cut to the base of the first leaf. The cost of topping varies with local prices for labor; it will be from six to eight dollars per acre in most sections.

COST OF GROWING AN ACRE OF BEETS.

This also varies greatly, depending on soil, season, wages, and the facilities available for caring for and handling the crop. Last season at this station it averaged \$33 for wages of man and team, and, in addition, about \$4.50 for fertilizers applied. The crop should not be charged with all of this latter amount. Figures from growers in various parts of the State give the cost anywhere from \$25 to \$35, but an average of these would be nearly right.

AVERAGE YIELDS AND PRICE.

Dependent upon conditions before given, the