

Fertility, Tillage and Clover Seeding.

Clover, roots, and corn are yearly more and more becoming necessities in successful stock-raising, and in some respects clover is the most important, as usually it is easier to provide substitutes for the others, and the loss of a crop (partial or total) does not upset a rotation, as the failure of a clover crop will. Therefore, the ensuring of a good catch of seed is worth giving special attention to in our annual operations in the fields.

During the past ten years, not only with us but in the neighborhood generally, good stands of clover are the rule. Previously, it was different, and failures were not at all rare. In endeavoring to trace the cause or causes of improvement, three conditions come readily to mind, namely, fertility, tillage, and method of sowing. Soil generally is clay loam—medium to heavy—with considerable tile draining done in low-lying sections.

The increase of fertility has resulted from a complete change of system. Grain-growing and selling of grain have given place to (not less growing of grain in quantity, though acreage is reduced) a large increased feed production and the selling of nearly all of the productions in the finished products of beef animals, mutton, sheep, bacon hogs, butter, cheese, and poultry products. And the tillage has greatly improved; getting the land as fully prepared as possible in the fall, all plowing being then completed; the excellent implements provided by our manufacturers used freely to make a fine surface tilth of two or three inches, making a proper bed for the clover seed to germinate in and quickly send out its rootlets to gather nutriment and strength to soon develop it so as to be beyond the danger of withering soon after the plant shows above ground, should a spell of heat and drought set in, which not infrequently happens. It is our opinion that many stands of clover fail completely at that stage simply because the necessary conditions of abundant plant-food and moisture, saved by good tillage, are wanting in the soil at that most critical time.

The place which the tiny clover seed gets in the soil has much to do with its success or failure in producing a strong, vigorous plant. If placed too deeply, and particularly in clay loams (which tend to crust after rains, or if tilled when damp), the effort in reaching the surface seems to exhaust the vigor of the plant, which often fails to get through. Because of that danger, for many years we have practiced sowing the grain and harrowing the land, getting it ready for the roller. Immediately after harrowing, the seeds are sown by hand with a "Cyclone" seeder, and rolled soon after. No matter how fine the soil is, the seeds will find their way into crevices sufficiently deep to insure germination, when packed down with the roller sent over the freshly-harrowed surface. Should rain pack the soil soon after, the harrow is sent over the field to break up the crust. Seeding is done invariably in the spring, with wheat, oats, or barley, and usually on land which grew roots or corn the previous season. It is important to not sow the grain too thick. Farmers some distance off, on loam and even light-loam farms, have reported most satisfactory results from hand-sowing seeds and simply rolling after, compared with machine sowing, when the seed falls among the hoes, and much of it gets deeply bedded in the soil.

Victoria Co., Ont.

JOHN CAMPBELL.

Good Results from Rape --- How About Spring Rye?

Perhaps it is a little early in the season to write about seed grain, but as the different seedsmen are sending out their annual catalogues it makes us think of spring. Every farmer should have his plans laid out now for next spring's work. My object in writing this is to give as well as get a little advice. Last summer being very dry and pasture scarce, I decided to try some rape for pasture. Accordingly, I plowed up eleven acres in June, which was as dry as ashes. I worked it down fine and sowed sixty pounds of rape seed on it the last day of June. The weather was very dry and it was a long time coming up, but after a while we got a shower that started it growing. It made the best lot of pasture I ever saw, and the young cattle fattened on it so that I sold them to the butcher. The beauty of it is that it keeps green right up till winter, the frost not hurting it at all. I shall certainly try it again next summer, and would advise others to do so. It is said to be good to turn down for manure as well. So much for the advice given. Now, I would like to know what has been the experience of other farmers with spring rye, which I see advertised and would like to try? I thought the "Farmer's Advocate" would be the right place to apply to for information, as it reaches farmers all over the country, and no doubt some one of them has tried it. My land is clay loam.

Welland Co.

R. HARTLEY.

Management and Application of Barnyard Manure.

To the Editor "Farmer's Advocate":

Sir,—The long-continued cropping of our farm land, that which I work having now been tilled steadily for over fifty years, makes the preparation and application of our barn manure an all-important question. I have been somewhat surprised to read that the investigations conducted under the direction of Dr. Wm. Saunders, Director of the Canadian Experimental Farms, went to show that, weight for weight, fresh stable manure was equal in value to rotted, and that the losses with the latter were very great. I will feel indebted to the Director if, through your columns, he will tell us if he has been correctly reported, particularly on the first-mentioned point, and upon what data he based his conclusion? My experience seemed to indicate a much better crop, and freer from weeds, where the rotted manure was applied. I would like, also, if the Director would state what he considers the preferable mode of applying manure to the land, whether spreading direct on the fields in winter or placing it in small or large piles to be spread in the spring, indicating, in a few words, the conditions under which he has demonstrated certain plans to be more advantageous. At the present time these two questions are not only seasonable but of vital import to thousands of your readers. I am not writing in a disputatious spirit, but to get at the truth.

"SON OF THE SOIL."

DR. WM. SAUNDERS' REPLY.

I take pleasure in replying to the enquiries of "Son of the Soil" as to the important question of the relative usefulness in crop-producing power of barnyard manure, fresh and rotted. This matter, so important in regard to economy in the use of barnyard manure, has been fully presented in the annual reports of the Experimental Farms during the past ten years, and since these reports have reached the homes of about fifty thousand farmers annually, distributed over all parts of the Dominion, and these barnyard-manure experiments having been much discussed, it was supposed that farmers had become fairly well informed on this subject.

The trials which have been made with barnyard manure, fresh and rotted, with a check plot alongside which has never received any manure, were begun in 1888 with spring wheat and Indian corn, and in 1889 with oats, barley and roots. Barnyard manure (mixed horse and cow manure) was used in 1888 on the wheat, in the proportion of 12 tons to the acre, and each year following, 15 tons per acre. To the oats and barley the manure was applied at the rate of 15 tons per acre; the corn was continued at 12 tons per acre, while the roots (turnips and mangels) have had an annual dressing in the proportion of 20 tons per acre.

No results were published until the end of five years, when the average crops for that period were given. Each year since then the annual reports have contained the results for the current year and the average for the whole period.

These annual dressings of fresh and well-rotted barnyard manure were continued until (and including) 1898, so that the trials were repeated for 10 or 11 years in succession, and at the end of that time the average crops stood as follows:

AVERAGE FOR ELEVEN YEARS.

Barnyard manure well rotted.		Barnyard manure, fresh.		Check plot, to which no manure has been applied.	
Sg. wheat:		Grain.	Straw.	Grain.	Straw.
Grain, lbs.	20	Grain, lbs.	20	Grain, lbs.	20
Bush. lbs.	3,709	Bush. lbs.	3,689	Bush. lbs.	1,899

AVERAGE FOR TEN YEARS.

Barnyard manure well rotted.		Barnyard manure, fresh.		Check plot, to which no manure has been applied.	
Barley:		Grain.	Straw.	Grain.	Straw.
Grain, lbs.	34	Grain, lbs.	35	Grain, lbs.	13
Bush. lbs.	3,051	Bush. lbs.	3,280	Bush. lbs.	1,594
Oats:		Grain.	Straw.	Grain.	Straw.
Grain, lbs.	48	Grain, lbs.	51	Grain, lbs.	30
Bush. lbs.	3,233	Bush. lbs.	3,467	Bush. lbs.	1,534

In the experiments with Indian corn, two varieties have been used each year: one a vigorous-growing and later-ripening sort, known as No. 1; the other a shorter-growing and earlier-maturing variety, known as No. 2; and the corn has been cut green each year when in the best condition for the silo.

AVERAGE FOR ELEVEN YEARS.

Barnyard manure well rotted.		Barnyard manure, fresh.		Check plot, to which no manure has been applied.	
Ind. corn:		No. 1.	No. 2.	No. 1.	No. 2.
Tons, lbs.	16	Tons, lbs.	17	Tons, lbs.	7
	210		221		1278

AVERAGE FOR TEN YEARS.

Barnyard manure well rotted.		Barnyard manure, fresh.		Check plot, to which no manure has been applied.	
Turnips:		Tons, lbs.	Tons, lbs.	Tons, lbs.	Tons, lbs.
Tons, lbs.	15	Tons, lbs.	15	Tons, lbs.	7
	196		184		124
Mangels:		Tons, lbs.	Tons, lbs.	Tons, lbs.	Tons, lbs.
Tons, lbs.	23	Tons, lbs.	22	Tons, lbs.	9
	212		269		211

Similar experiments have been conducted for

eight years with carrots and on two series of plots with potatoes for five years, with the following average results:

Barnyard manure, well rotted.		Barnyard manure, fresh.		Check plot, to which no manure has been applied.	
Carrots:		Tons, lbs.	Tons, lbs.	Tons, lbs.	Tons, lbs.
Tons, lbs.	19	Tons, lbs.	21	Tons, lbs.	11
	758		20		1953
Potatoes:		Bush, lbs.	Bush, lbs.	Bush, lbs.	Bush, lbs.
Bush, lbs.	266	Bush, lbs.	272	Bush, lbs.	111
	17		32		19

These experiments have been conducted throughout with the greatest care, with the sole object of arriving at the truth. A study of the figures given will show that with three exceptions—spring wheat, Indian corn No. 2, and mangels—the fresh manure has given the larger crops, and will, I think, convince the reader that the case has not been overstated when I have said that in our experiments covering 10 and 11 years, a given weight of barnyard manure, fresh, has shown itself to be equal in crop-producing power to the same weight of barnyard manure rotted.

Since 1898 these experiments with fertilizers have been modified, with the view of gaining information as to how long the good effects of these repeated applications will continue to influence subsequent crops, and all the fertilizers have been discontinued. For reasons given in the annual report, a crop of clover has been grown each year with the grain and plowed under, but as the results of this work have no direct bearing on the questions asked by your correspondent, I must refer those of your readers who may wish to pursue this subject further to the annual reports of the Experimental Farms.

With reference to increase of weeds where fresh manure is used, there is no doubt that where weed seeds are freely fed to stock in hay, straw, and grain, that a larger proportion of ungerminated weed seeds will be found in the fresh manure, but since manure is most generally used with a hoed crop, the presence of additional weeds is not a matter of much moment, for if the land is kept well worked, the cultivator and hoe will clean them out regardless of number.

As to the next point referred to by your correspondent, that of the loss which occurs in manure during the process of rotting, that is very large. The first experiments made at the Central Experimental Farm to determine this loss were conducted in 1895 by the Director, under ordinary farm conditions, when four tons of manure was used, two tons each of horse and cow manure. In three months the 8,000 lbs. uncovered in the barnyard was reduced to 3,947 lbs., and in seven months to 2,812 lbs. (See Ann. Rept., 1895, p. 42.) In a series of experiments subsequently conducted by the Chemist of the Experimental Farms (see bulletin '31 on barnyard manure), where the conditions were more favorable for preserving the manure from loss, the decrease in weight averaged about 60 per cent. By analysis it was shown that the loss also in organic matter, which in barnyard manure is so important as furnishing humus to the soil, was more than one-half. The following results were obtained:

RESULTS OF ANALYSIS OF BARNYARD MANURE THREE MONTHS ROTTED.

	Manure protected. Per cent.	Manure exposed. Per cent.
Loss of organic matter	55	60
" nitrogen	17	29
" phosphoric acid	none.	8
" potash	none.	22

It should be understood that the protected manure in this case was so thoroughly enclosed and sheltered that there was no possibility of any leaching, and the exposed manure was also under conditions more favorable as to preservation from loss than would be practicable for the average farmer to provide. The rotted manure which we have used from year to year in the experiments conducted at Ottawa has been rotted under the ordinary conditions of exposure found in the average farmyard.

From the facts and figures submitted, it is evident that barnyard manure loses during the ordinary process of rotting when exposed to weather, more than half its weight, more than half its organic matter, and a large proportion of its plant food. The potash and phosphoric acid can to a large extent be preserved if the manure is so protected as to prevent leaching, but even then the loss in nitrogen—the most expensive of all plant foods to buy—is large, and the loss in organic matter is almost as great as when the manure has been exposed.

The plan we have most generally adopted at Ottawa is to use the manure fresh on the land whenever practicable, and plow it under. During the winter it is usually distributed over the ground on which it is to be used, in small piles of about one-third of a cart-load each. These small piles are soon frozen through so that all fermentation is checked, and when spread in the spring and plowed under, it is practically in the same condition as when it left the barnyard. In the Ottawa climate there is very little danger of