

# MICHIGAN AGRICULTURAL COLLEGE

## EXPERIMENT STATION

PRESS BULLETIN NO. 13

### FERTILIZERS FOR SUGAR BEETS

Bulletin No. 179 of the State Experiment Station, which will be sent out shortly, reports the results of experiments with sugar beets at the College farm during the year 1899, conducted by Prof. J. D. Towar, the Agriculturist of the Station.

Owing perhaps to the severe drouth early in the season, subsolling just before preparing the seed bed resulted in the practical failure of the crop. Plowing under coarse manure, applied during the winter previous, gave increased tonnage, with a normal content of sugar, and without making the beets ill shaped; but where the coarse manure was applied late in the spring and plowed under just before planting, the resulting crop contained many prongy beets. Where the manure was well rotted and spread on the surface after plowing, but well harrowed in, the beets were smooth, straight and rich in sugar.

Twenty loads per acre of well rotted stable manure gave a smaller yield than four hundred eighty pounds of home mixed fertilizer per acre, the fertilizer costing twenty-seven dollars and fifty cents per ton, the soil being a very sandy loam.

Nitrate of soda alone gave a fair yield of beets, with a per cent of sugar lower than the normal, but when applied in combination with potash and phosphoric acid it increased the yield without reducing the richness in sugar. Nitrate of soda gave better results than sulphate of ammonia.

On a sandy loam fairly rich in organic matter wood ashes and salt slightly increased the yield.

The results with lime varied according to the nature of the soil. On loams the application of air slaked lime slightly increased the yield; but on muck that had been cultivated over ten years and therefore was well subdued and not decidedly acid, lime worked an injury to the crop, reducing both the yield and per cent of sugar, when applied with normal quantities of nitrogen, phosphoric acid and potash, but when applied alone on muck it increased the tonnage over adjoining plots to which nothing had been applied, but reduced the per cent of sugar.

A comparative test of the various kinds of soil showed the largest yield of sugar per acre from clay loam; next in order stood sandy loam, next sand, next clay, and last of all muck. In tonnage of beets per acre the order was the same except that muck stood next to clay loam.

On the muck all forms of potash gave increased yield, and unleached ashes proved a good fertilizer.

The plots earliest sown gave larger tonnage and more sugar per acre than other plots sown later in the season, the experiment continuing from the middle of April to the first of June.

Under the peculiar conditions of climate and soil existing at the College, beets harvested in October were richer in sugar than those harvested later in the season, the per cent of sugar declining gradually as the season advanced.

The illustrations in the bulletin show, among other things, the relation between the size of the beets and the per cent of sugar, a very interesting case of scab on beets grown on land devoted to potatoes the year preceding, and a case of gall on a beet grown on soil which had produced a crop of beets the preceding season.

C. D. SMITH,  
Director.

Agricultural College, Mich.,  
April 23, 1900.



# MICHIGAN AGRICULTURAL COLLEGE

## EXPERIMENT STATION

### Press Bulletin No. 13—Treatment of Seed Wheat to Prevent Stinking Smut.

The unusual prevalence of stinking smut in the wheat crop calls for extraordinary effort on the part of Michigan wheat growers to prevent a repetition of the loss next season. It is now well known that this smut is a disease carried forward from one year to another in the seed wheat. The disease converts the kernel into a black, ill-smelling mass of spores which, when the smutty kernels are broken up by the threshing machine or by handling, attach themselves to the sound kernels. After infected wheat is sown, the kernels and these spores of smut germinate at the same time. The smut plant grows inside the wheat stem throughout the season, and, when the crop is ripening, it turns the kernel in the head of the wheat into the well known smut kernels. The spread of the disease may best be prevented by finding, if possible, seed wheat free from smut. If you cannot obtain clean seed of your chosen variety, try the following treatment:

The first step is to clean off a space on the barn floor some ten feet square or larger if convenient. Sweep this area very thoroughly to remove all spores of smut possible.

Next buy of your druggist a pound bottle of formalin. He may not have this agent in stock, therefore, order it at once that he may have it in time for your use in September.

Mix the formalin with water in a large barrel in the proportion of one pound of formalin to four hundred pounds of water. This means that the pound of formalin should be mixed with fifty gallons of water, enough for thirty-five bushels of wheat. Knowing the proportions you can mix any quantity desired. Be sure to keep the bottle of formalin tightly and securely corked. It is not a dangerous poison but is unhealthy to take either by the nose or mouth. Do not mix the formalin and water until you are ready to use them.

Thoroughly wet the floor, on which you are to treat the wheat, with this formalin mixture, make it good and wet. Then spread on a layer of the seed wheat which you have previously well cleaned with a fanning mill. With a sprinkling

pot go over the layer of wheat, wetting it thoroughly, shovelling it over and re-sprinkling until every kernel is wet on all sides. Add more wheat and sprinkle or take up the wheat already treated and put down a new lot. Before putting the treated wheat into bags to carry to the field it may lay in a pile for a day, not longer because of the danger of heating and the farther danger that an excess of the formalin may hinder germination. Put the treated wheat into clean bags or into bags that have been wet with this formalin mixture. Be careful not to stir up a dust in the barn while the treated wheat is still exposed. The dust will be likely to be made up largely of the smut spores which we are fighting.

If you want to drill the wheat, it is well to allow it to dry either on a barn floor treated long enough beforehand with the formalin mixture to allow it to become thoroughly dry or on canvas, free from smut spores, and spread on the ground in the sun. The drill and everything else with which the wheat comes in contact after treatment should be free from smut spores or washed with the formalin mixture.

If you cannot buy formalin at your druggist's you may try corrosive sublimate if you dare when you remember that it is a deadly poison, and the greatest care must be taken to allow no animal access either to the drug itself or to the wheat that has been treated. Use a pound of corrosive sublimate to 400 pounds of water (fifty gallons). Dissolve the drug in three or four gallons of hot water in a wooden vessel. Do not allow the mixture to come in contact with metal. Later add enough cold water to bring the amount up to the fifty gallons. Proceed as with the formalin mixture, except that great care must be exercised to prevent poisoning live stock or children.

Our experiments have shown that either treatment will reduce the amount of smut in the wheat to a very small quantity or, if the season be right, will prevent smut altogether.

C. D. SMITH,

Director.



June 22, 1906.

Dear Editor:

The topics covered by the bulletins to be sent you will be of great and immediate importance to your readers. Will you kindly give them space in your columns?

THE DIRECTOR.

## Michigan Experiment Station

PRESS BULLETIN NO. 13.

### POTATO BLIGHT AND ROT.

Hundreds of dollars are lost each year in Michigan by the blighting and rotting of potatoes. Although its destructiveness is increased by wet, muggy weather, the disease is really caused by a fungus, and the loss can be largely if not entirely prevented by thoroughly spraying the vines with blue vitriol and lime, commonly called Bordeaux mixture. It seldom attacks early varieties that ripen before August 1, but if they are injured by beetles it will often pay to spray them with Bordeaux mixture and Paris green, which will also control another fungus known as "early blight."

The more injurious form which is called "late blight," seldom appears until August, although if the weather is hot and muggy during the latter part of July it will be safest to make an application at once and before the first sign of blight appears if possible. As a rule, it will answer if the first application is made by August 1st, and others should be made at intervals of ten or fifteen days, so long as the weather remains favorable for blight, although once in fifteen days will ordinarily answer. It will be well to continue the applications up to within ten days of the time the potatoes will be ripe. If the weather continues dry during August there is not likely to be very much blight, but as it cannot be foretold, and as the applications to be effectual must be made before the blight has appeared, it will be worth while therefore to spray once or twice during the first half of August, and then continue the spraying, if the weather is favorable for blight and especially if it has appeared in unsprayed fields.

As a rule, from three to five applications will suffice, but if the weather continues wet and muggy during the months of August and September, six or seven applications will be well repaid upon late planted potatoes. If one is well equipped for spraying, the expense for labor and material will not be more than eighty cents per acre for each application, or from \$2.50 to \$3.00 for the season, in average years, and this might suffice to save the crop as without the spraying it might be lost entirely.

For small areas a hand pump on a cart or wagon, to be worked by the driver, will be fairly economical but for twenty acres or more it will pay to use a special power spraying outfit. Most of these take their power from the wheels or axle. With either kind of outfit there should be a gas-pipe at the rear long enough to cover four or five rows, and attached to the pump by means of a hose. Just over each row there should be a double Vermorel nozzle, with which a fine spray can be produced that will entirely cover the plants.

Use four pounds of blue vitriol and six pounds of lime for fifty gallons of the mixture. To prepare it take as much blue vitriol as will be needed, say twenty-five pounds, and after placing it in a coarse sack suspend it in a barrel that is half full of water, where it will dissolve in a few hours. Also slake as much lime as will be required, so as the form a thick paste. When ready to spray, take a proportionate part of the blue vitriol solution and the lime as will give four pounds of the former and six pounds of the latter. Dilute each to twenty-five gallons and pour together, stirring it carefully at the same time.

In making the application, have the nozzles adjusted so as to thoroughly cover the plants, and if dashing rains wash it off it will be well to repeat the application within a day or two, especially if the weather is muggy, as the leaves must be kept covered to keep off the blight.

Not only is the blight more troublesome in wet seasons but it does most harm in poorly drained soils, and upon heavy clay more than upon sandy soils. Under the most favorable conditions it is liable to do considerable harm this year in sections where the disease appeared in 1905 and every potato grower whose potatoes rotted last year should prepare himself at once to spray this year.

L. R. TAFT,

HORTICULTURIST.