

FACTS ABOUT FERTILIZERS

VI.—How to Supply Our Potash Requirements

By C. A. MOGERS

DUE to the European war, potash salts are now selling from six to seven times as much as formerly. The question therefore arises, can they now be used profitably for fertilizer purposes? Another and closely related question is the possibility of using other materials which either act as substitutes for potash or enter into chemical reactions which set this element free, and so bring about a better utilization of the natural soil supply. Also there is the promising suggestion of the adoption of systems of farming which will make the best possible use of the available potash supply.

Can Potash Salts Be Used Profitably At Present Prices?

IN THE consideration of the possible profitableness of potash salts, the fact should not be overlooked that the country is not producing, or able to get in any way soon, more than a small fraction of the quantity demanded previous to the war. Assuming, however, an adequate commercial supply, but at say 30 cents per pound of K₂O, for what crops, if any, can it be used with a reasonable chance of profit? In answering this question, a number of factors must be taken into consideration: one is the soil need of potash; another is the special effect of potash deficiency on the individual crop; and a third and very important item is the market value of the crop. Also we must remember that the use of any fertilizer is attended with the risk of a very unfavorable season which will make the application next to worthless so far as the crop of that season is concerned.

With regard to soil need, we can safely say that the less the need the greater will be the risk in using potash as well as any other of the plant food elements. There is at least one good reason for this statement, to wit, that the less an element is needed the less it is apt to be the limiting factor in crop production; that is, seasonal conditions and other disturbing influences often limit the crop. The results of the Rothamsted experiments, for example, long ago showed that as the yield increased it became more and more difficult to make any further increases by the application of nitrate of soda, not because of any over-supply of this material, so far as the plants were concerned, but because soil moisture was insufficient to allow of a further utilization of it.

As to the effect of potash on the different parts of the plant, the general rule is that a deficiency of potash affects first of all the stem and leaf growth. A considerably greater deficiency is required to cut down the production of the grain of corn, wheat, etc. On the other hand, a hay crop is particularly liable to be reduced by a deficiency of potash. At the Tennessee Station, for example, a no potash plot where both a cowpea and a wheat crop have been removed each year for ten years in succession, gave an average yield of 0.65 ton of cowpea hay per acre for the last five years. An adjoining plot under the same conditions, except that 50 pounds per acre of muriate of potash was applied annually, gave an average yield of 1.09 tons of cowpea hay. These same plots, however, yielded 15.3 and 16.2 bushels per acre of wheat respectively as the average for the last five years. Potash was therefore of appreciable advantage to the crop of pea hay, but not for the wheat, the yields of which were easily within the limits of error.

As further illustrating the effect of potash on different crops, experimental results from South Carolina

may be cited. At the Coast Station 40 pounds of muriate of potash per acre increased the yields of corn and oats practically 3 bushels each, the cowpea hay was increased by 350 pounds, and the seed cotton by 270 pounds. At the Pee Dee Station corn showed a decrease from the application of 83 1-3 pounds of muriate of potash per acre, but the increase of both oats and pea hay was about as at the Coast Station, while the increase of seed cotton was 320 pounds per acre. Cotton therefore as well as the pea hay was especially benefited by the application of potash.

The third consideration, the market value of the crop, is the most important of all. At 30 cents a pound for potash it is easy to see that only those crops which give the greatest returns per acre can be seriously considered. Either wheat or corn, both the grain and the other parts of the crop being included, remove in the neighborhood of 1 1-4 pounds of potash per bushel, or 37.5 cents worth; pea hay, clover hay, etc., remove 50 to 40 pounds of potash per ton or \$9 to \$12 worth. On the other hand, a bushel of Irish potatoes contains only about one-fourth pound of potash, or 7.5 cents worth. With respect to cotton, the approximate figures are as follows:

PER BALE OF COTTON

500 lbs. lint cotton contains	2.30 lbs. potash @ 30c	\$ 0.69
1090 lbs. seed contains	12.75 lbs. potash @ 30c	3.83
Stems, leaves and bolls..	44.95 lbs. potash @ 30c	13.48
Total	60.00	\$18.00

To sum the matter up briefly, after reviewing the results of field experiments obtained at various places, the writer feels justified in saying that with the exception of cotton and certain truck and fruit crops, the use of potash salts for fertilizer purposes is not justified at present prices, and that even for the crops mentioned their use is not warranted except on soils greatly in need of this particular element, and even then the amount used should be reduced below that recommended under ordinary conditions.

Substitutes for Potash Salts

THE question of substitutes for potash salts is of importance not only now but in the future. At the outset it should be recognized that no other element can completely take the place of potash so far as its physiological functions in the plant are concerned, but the results of a number of experiments, such as those made in this country by Wheeler and Hartwell at the Rhode Island Station, show that sodium salts help in a case of potash deficiency, that is, an application of a sodium salt enables the crop to get along with the minimum amount of potash. Some of their results are of special interest. Various kinds of root crops, such as turnips and beets, were especially benefited by sodium salts, so that a one-fourth ration of potash with a full ration of sodium salts gave nearly as good returns as a full ration of potash. In the case of mangel wurzels, sodium salts added to an application of 300 pounds per acre of muriate of potash greatly increased the yield.

The results of the Rothamsted experiments from 1852 to 1901, as given by Hall, showed that either sodium or magnesium sulphate maintained crop yields without potash for a number of years, but that as time went on the plots receiving only these salts yielded relatively less and less but the plot where potash was used alone approached in yields the plot where all three had been used. A practical conclusion from such results is that cheap salts of either

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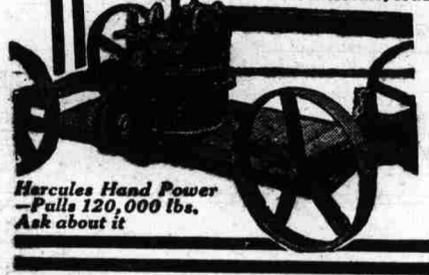
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