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COFEEAS—SOY BEANS,

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One acre \$1.25; 5 acres \$5.00, delivered. Fully guaranteed.

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Acid Soils Tested for \$1.00 Each.

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That will destroy San Jose scale and fungus on fruit trees. Best manufactured. Write

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Save your papers and get a binder.

HOW TO USE FERTILIZERS IN THE PIEDMONT SECTION

Phosphoric Acid Generally Needed, and Is Best Supplied by Acid Phosphate—Nitrogen Should Come From the Air—Potash Seldom Necessary for General Field Crops

By C. B. Williams, North Carolina Experiment Station

[While writing primarily for the Piedmont section of North Carolina, what Professor Williams says will also apply on most farms of the Piedmont regions of Virginia, South Carolina and north Georgia.—The Editors.]

DURING the past 12 or 14 years, we have in North Carolina been making a systematic study of the plant food deficiencies and requirements of the soils of the Piedmont section of the state. The work has embraced: (1) a survey and mapping of the different types of soils occurring in this region, in order to show the location and extent of the different types; (2) making chemical analyses of the different soils in order to determine the amounts of the different plant food constituents they each contain per acre; and (3) then to conduct on each of the important soil types field experiments to ascertain for each their fertilizer requirements for the leading crops grown in the section, the most economical methods to use in building them up, and to determine the crops to which they are best adapted. This work has now progressed far enough to draw certain rather definite conclusions with reference to each soil type on which the experiments have been conducted.

Phosphoric Acid Needed

THE results which we have secured during the past 12 years from the different experimental fields located in the Piedmont section of North Carolina show phosphoric acid to be the chief deficiency of these soils except for the Iredell loam. This latter soil is generally known as "black-jack" soil. With this exception, wherever this constituent has been applied the yields have been markedly increased. Chemical analyses, too, show that generally Piedmont soils contain a very limited quantity of this constituent—far too little for the growth of maximum crops where they are farmed extensively, except in the case of Iredell loam, Mecklenburg loam, Congaree silt loam, and Congaree fine sandy loam soils. As a general thing, less than 20 to 25 large crops of corn would entirely remove the amount of this constituent contained in the surface six and two-thirds inches of soil.

Phosphoric acid may be obtained in commercial forms from a good many sources. These are acid phosphate, basic slag, bone meal and finely ground phosphate rock or floats. Floats is the common name that is frequently applied to finely ground phosphate rock. Acid phosphate is secured by treating finely ground phosphate rock with sulphuric acid, or oil of vitriol. Basic slag is a by-product obtained in the manufacture of steel from iron ores containing considerable phosphorus; and bone meal is obtained as a by-product from slaughter houses. Of all these, acid phosphate is the form most commonly used in this state. It contains its phosphoric acid generally in a more readily available form than do the other carriers of phosphoric acid.

For certain soils requiring lime, basic slag may be a very suitable carrier of phosphoric acid, if the price per pound for its content of phosphoric acid is not too high. Its phosphoric acid, however, is not generally in as available form as that contained in acid phosphate. The least soluble and cheapest form of phosphoric acid is floats. If the floats are used on soils containing a large amount of organic matter, or in connection with the plowing under of a large amount of vegetable matter, it will probably be a very economical source of phosphoric acid. When used in the proper way, floats should materially increase the yields and at the same time aid in building up the phosphoric acid supply of the soil faster than could be done in the case of using the others

when the same amount of money is expended per acre.

The mixing of the floats, or finely ground rock phosphate, with stable manure as the manure is being formed in the stables is certainly to be recommended. We would suggest that from 75 to 100 pounds of the rock be added to each ton of manure. When using the rock at the time the clover or some other green crop is turned under, it is recommended that from 600 to 1,000 pounds per acre be applied every three to four years. It should be kept in mind, however, that for quick returns acid phosphate properly used will generally be found to be the most economical source of phosphoric acid, although the phosphoric acid will cost in acid phosphate two to three times as much per pound as it would cost in the phosphate rock.

Nitrogen Essential

IN TRAVELING through the Piedmont section of this and other Southern states one is very much impressed with the fact that most of the cultivated soils are deficient in organic matter. As organic matter is the chief source of nitrogen in the soil, it is essential, in order to have the soil well supplied with this constituent, to keep up the organic matter present in the soil. Not only this, but with our Piedmont soils, very subject to washing, the organic matter will materially aid in their water-holding power and prevent, when properly handled, excessive washing.

The other sources of nitrogen are commercial fertilizers, farm manures, and the free nitrogen of the air. Many nitrogenous materials are used for fertilizing purposes, but these are all expensive; especially is this true for the Piedmont region of this and other Southern states, since most of the crops adapted to growth in this section are heavy feeders of nitrogen.

In the Coastal Plain region, where cotton is the chief crop, the exhaustion of the nitrogen supply of the soil need not be heavy if the seed are not sold from the farm and crops are kept growing on the land throughout the year in order to prevent the loss of this constituent by leaching. Ordinarily, a bale of cotton will not remove from the soil more than 40 to 50 cents worth of fertility. With cotton, either in the Piedmont or Coastal Plain region, commercial forms of nitrogen may be used generally with profit.

Where grasses and grains are the chief crops, as is largely true for the Piedmont section, other carriers of nitrogen than the commercial forms will have to be largely depended upon, if the greatest profits are to be secured. Stable manure is a very suitable source of nitrogen for this purpose. It also contains large amounts of organic matter and small amounts of phosphoric acid and potash. As it is not a well balanced fertilizer for Piedmont soils it, in order to be most effective, should be fortified with the addition of phosphoric acid. Notwithstanding the great value of this carrier of nitrogen and organic matter, Piedmont soils cannot generally be built up by depending upon the use of manure alone, because in the handling of manure there will usually be a great loss of its nitrogen. The only other source of nitrogen, then, that can be drawn upon is the atmosphere. Here we find an inexhaustible supply which can be permanently depended upon to supply nitrogen to our Piedmont soils. It should be remembered, however, that most crops like corn, cotton, grasses and the small grains are unable to take any of this nitrogen from the air. It is only with the

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clovers, peas, beans, vetches, etc., that power is given to reach up and take this nitrogen and utilize it in their own growth, and later to leave it in the soil while the crop or crop residues are allowed to remain and decompose in the soil. They, therefore, furnish an economical means of maintaining and upbuilding the supply of this most expensive constituent in our soils.

Potash Not Generally Essential for General Crops

IN OUR examination of a large number of types of soil of the Piedmont region of this state, it has been found that the amount of potash present in the surface soil is generally sufficient, were it in available form, for the growing of maximum crops for a hundred years or more. It is, therefore, a problem, with most Piedmont soils, of rendering the potash available so that the plants will be able to utilize it in their growth. It might be stated that in the growing of clovers or other cover crops to be turned into the soil the use of stable manure or woods mold will have a tendency generally to render more available the potash in these soils. Not only has chemical analysis shown these soils to be generally well supplied with potash, but with general crops in most cases very little increases have been recorded from the use of this constituent. As a rule, it would certainly pay to substitute the money expended for potash for an investment in some available form of phosphoric acid. In the case of such crops as tobacco, Irish potatoes, and many of the legumes, it is probable that its use on many soils will prove beneficial.

Lime Not Generally Essential

ON AVERAGE soils deficient in organic matter, with such crops as corn and cotton, lime has been found to give but little if any returns above cost of material. However, where cowpeas have been grown on the soil and turned into it for a few years, then lime will generally be found to give good returns when used in moderate amounts. For the growth of clovers, vetches, etc., it will probably prove beneficial in most cases. A chemical examination of the soils of this section does not show them to be strongly acid or lacking in a fair supply of lime. Of the soils thus far examined in the Piedmont section, the Iredell, Mecklenburg and Congaree series are the ones containing the highest percentages of lime.

The Time Is Ripe For Action

ISEE that The Progressive Farmer and the Farmers' Union are advocating the repeal of the crop lien law. This is the most damnable law that the farmers of the South ever toted. It has bled them to build up others. Go on with your segregation law; the time has come for it, and the time has sure come for the crop lien law to be repealed.

Farmers can't afford to stand still and see their lands robbed, and the merchants all broke. Mortgaged crops depress prices. I don't think that the merchants will oppose the repeal of the law—certainly not as they would have some years ago.

G. T. TYSON,

Greenville, N. C.

Good Sense in This

IT IS a pleasure for this paper to have items of news about good yields of any kind of crops that the farmers may have. If a man makes good stuff in any line of work on the farm we are glad to report it. It is good news, helpful and stimulating to others as well as to the man who has done it. But such things as three-legged chickens and goose-neck eggs are merely freaks which everybody has seen and should not be reported at all. Send items which show what you can do, for these we are glad to get, and they are serviceable.—Monroe Journal.