

STATE DOCUMENT
APR 2 1926

TOLEDO PUBLIC LIBRARY
TECHNOLOGY DEPARTMENT

BUYING FERTILIZERS

Extension Division

R. J. Baldwin, Director

Michigan State College
Of Agriculture and Applied Science

BUYING FERTILIZERS

By O. B. PRICE

WHAT ARE FERTILIZERS?

Fertilizers are chemical compounds used to supply the soil with those plant food elements which are found to be limiting crop production. There are ten essential plant food elements: nitrogen, phosphorus, potassium, calcium, carbon, hydrogen, oxygen, sulfur, iron, and magnesium. Of these ten, only three are usually limiting in Michigan soils. These are nitrogen (ammonia), phosphorus (phosphoric acid), and potassium (potash). The other elements are usually sufficient, with the exception of calcium and magnesium, which may be limiting in some types of soil.

The actual ingredients in fertilizers are ammonia, phosphoric acid, and potash. When a fertilizer contains all three ingredients, such as a 2-16-2, it is a complete fertilizer. When it contains only one or two, such as a 0-12-6 or 0-20-0, it is not a complete fertilizer.

Mixed fertilizers are made up of both organic and inorganic materials. Organic materials most commonly used are tankage, fish scrap, dried blood, cottonseed meal and bone meal. Inorganic materials commonly used are acid phosphate, sulfate of ammonia, nitrate of soda, muriate of potash, and sulfate of potash.

WHAT TO CONSIDER IN BUYING FERTILIZERS

1. Soil Type

On many of the heavy types of soil, such as the Brookston, Nappanee, and Miami, acid phosphate alone is usually sufficient for all crops. On the sandy types of soil, complete fertilizers may be needed. In any fertilizer for mineral soils, the phosphoric acid content should be highest.

Muck soils usually have potash as their first requirement.

2. Crop Grown

Grain crops usually do not give much response to potash, even on the lighter soils. Alfalfa and sweet clover need potash as well as phosphoric acid. Potatoes need some potash.

3. System of Farming

If large amounts of livestock are kept, so that four to five tons of manure per acre per year can be used, acid phosphate will often be the only fertilizer required. If strictly grain farming is followed, leguminous green manure should be turned under for nitrogen. Acid phosphate and sometimes potash will have to be bought.

4. Analysis of Fertilizer

USE HIGH ANALYSIS FERTILIZERS

Any fertilizer containing a total of 14 per cent or more, (or 14 units) of plant food is termed a high analysis fertilizer, although those fertilizers containing from 14 units to 16 units are not very high analysis.

When high analysis fertilizers are bought, the farmer pays more per ton for the fertilizers, but the price per pound of plant food is less. An example: A 1-8-1 costing \$29.50 per ton costs the user 14.7 cents per pound of plant food. A 2-16-2 containing twice the amount of plant food in exactly the same ratio and costing \$40.30 per ton costs the user only 10.7 cents per pound of plant food.

When high analysis fertilizers are used, higher grade plant food carriers must be used, and there is less room for the so-called "filler."

Acid phosphate occupies the same position. The higher the analysis the cheaper the plant food.

Buy fertilizers on the basis of available plant food present.

USE STANDARD FERTILIZERS

The Standard Fertilizers for Michigan are as follows:

0-16-0*	4-12-0	3-8-24**
2-12-2	0-12-6	0-8-32**
2-16-2	2-8-16**	Nitrate of soda
2-12-6	4-8-16**	Sulfate of ammonia
3-12-4	0-12-12**	Muriate of potash
4-8-6	0-8-24**	

The fertilizers listed above are sufficient to meet the requirements of any crop on any soil. The use of standard fertilizers will simplify things greatly. Instead of more than 200 brands and analyses of fertilizers, there will be only 17 analyses to remember, resulting in more efficient fertilizer use.

Other fertilizers may be used instead of the standard list with just as satisfactory results, but it would be cheaper for a fertilizer manufacturer to put on the market one standard analysis rather than three or four analyses so similar that little difference could be obtained in their usage. The result of standardization will be a more economical use of fertilizer.

MANURE VERSUS FERTILIZERS

When compared on the basis of the plant food content, commercial fertilizers are considerably more concentrated than barnyard manures. One ton of manure contains on the average about 25 pounds of plant food, while a ton of 2-16-2 fertilizer contains 400 pounds of available plant food. The average composition of manure is 10 pounds of nitrogen, five pounds of phosphoric acid, and 10 pounds of potash per ton. On the percentage basis, it would be .5-.25-.5, or 1.25 per cent of plant food per ton.

Acid phosphate. 0-18-0, 0-20-0, 0-24-0 and 0-44-0 may be used. Recommended for muck soils.

If four to five tons of manure per acre per year is applied, the nitrogen and potash needs of the crop to be grown will be taken care of_ but the average Michigan farmer puts back only one ton per acre per year. Where sufficient manure is used, acid phosphate will be the only fertilizer needed.

Manure also supplies large amounts of organic matter, which is important on all soil types. If the supply of manure is limited, production may be maintained and soil fertility increased by using leguminous green manure for organic matter and nitrogen, and fertilizers for phosphoric acid and potash. Use all the manure available.

WHAT PLANT FOODS DO

Phosphoric Acid-In plant nutrition, this important plant food is used largely for the formation of seed or fruit. It also aids in hastening the maturity and the development of roots. It is important to have enough available phosphoric acid in the soil. All types of soils need phosphoric acid.

Nitrogen-Nitrogen is used primarily to give vigorous vegetative growth. It also forces the plants along, but if heavy applications are used nitrogen may retard the maturity of the plant. Nitrogen is often limiting in the sandy soils. Growing green manure and applying barnyard manure will supply most of the nitrogen. It is expensive to buy, but profitable where needed.

Potash-Potash is used in the plant to stiffen the tissues and aid in the formation of starches. Potash is usually not a limiting factor, but on the sandy and sand loam soils it may be, particularly on the legumes, such as alfalfa and sweet clover. On muck soils it is usually limiting.

FACTORS EFFECTING FERTILIZER EFFICIENCY

1. Drainage-A soil must be well drained in order to make the use of fertilizers profitable. It would be a waste of time and money to apply high priced fertilizers on water logged soils.

2. Lime-It is evident from experimental work and from results obtained by farmers that the results from the use of fertilizers are materially decreased when they are applied to a very acid or "sour" soil. Many of the soils in the state need both lime and fertilizers. If they do need both, lime should be applied first. Lime will not take the place of fertilizers; neither will fertilizers take the place of lime. Fertilizers, with the exception of sulfate of ammonia, will not make soils acid. This fertilizer can be used on limed soils or soils naturally alkaline.

3. Organic Matter- A soil must have active , decomposing organic matter to make fertilizers most effective. Poor results attributed to fertilizers are sometimes due to lack of organic matter in the soil. Fertilizers will not take the place of organic matter.

4. Climate Rainfall, in particular, has a direct effect on the efficiency of fertilizers. A cold, wet spring will make nitrogen applications more effective .