

PHOSPHATE

By Dr. Carey A. Reams

The factor which determines the mineral content in any produce, whether it is a grass, or anything else, is the phosphate in the soil. The higher the water soluble phosphate, the higher the mineral content. In order to get the maximum amount of nutrient in the crop, and the maximum yield, a minimum of 400 lbs. per acre of available phosphate is needed. That much cannot be supplied from superphosphate, triple superphosphate, or hard rock phosphate. Soft rock phosphate is the best way to achieve this level, besides its having many other benefits.

Superphosphate (0-20-0), is highly acid. If you were to use it to apply the total needed amount of phosphate, it would kill the ground and ruin it for crop production for three years. Superphosphate is used for two things: one, as a catalyst, in order to change soil from an anionic condition of growth to a cationic condition of production; the second, to create energy. Triple superphosphate (0-46-0), is not usable in place of soft rock phosphate for a number of reasons: It is very easily leached out of the soil; it has a tendency to create too much heat in the soil; and it causes the soil to become packed and hard. Recovery of the phosphate in superphosphates is extremely inefficient, often as low as 10 to 15% of the total application. Hard rock phosphate cannot usually be substituted for soft rock phosphate. It would be safe to apply at the necessary rate, but it would take a number of years for the hard rock phosphate to become available without strong bacterial action. The hard rock phosphate to begin with, is actually animal bone matter and, therefore, has not weathered long enough to become water soluble. Only about 3% of it is available. Hard rock phosphate is usually treated with acids in order to produce superphosphates.

Soft rock phosphate is found in central Florida, in the Dunnellon area, in what is known as the "hard rock" section. Many thousands of years ago, nature left these phosphate residues from the teaming of marine life which once populated the region. Rock and clay rich in phosphorus was the result. When mining of the rock started almost a century ago, the clay on and between the big boulders was washed into pits and drying beds. These pits and beds, are, today, the deposits of soft rock phosphate.

The phosphate and other nutrients in soft rock phosphate are in colloidal compounds. Compound colloids are not water soluble, but they stand in suspension in water and create the impression that they are. They will stay in suspension, just like the dust particles that one sees in the air when the sun shines into a room. Compound colloids are so small that one cubic inch of them, equally dispersed, will cover 7-1/2 acres. They are so fine that they will fit into the holes in water, between the molecules of water. They are 100% available to plants, and they will not leach out of the soil. A compound colloid is like a small bearing in the soil; it fits any plant frequency, and allows nutrients to go into a

plant without resistance. "A plant food in colloidal state appears most active and efficient and seems to have remarkable powers," says Milton Whitney, Chief of Bureau of Soils, U.S. Department of Agriculture. Elements in a compound colloid are non-poisonous and non-toxic and will not harm the bacteria in the soil.

After 300 lbs. of soft rock phosphate and 1 to 2 ton of lime are applied, in that order, per acre, something happens in the soil. It forms a phosphate of calcium. The union which takes place is one of the most powerful magnetic forces that can be imagined in soil chemistry. A battle takes place in the soil the first 14 days after these elements are applied in which insects, grubs, fungi, weed seeds, etc., are killed. If this battle made any noise it would be heard for 50 miles. It is important NOT TO PLANT FOR 14 DAYS after applying the soft rock phosphate and the lime. After they combine (in 10 to 14 days) it can rain, flood or sleet, and the bond will not be affected. A kind of glue is formed, a gelatinous substance in the soil.

This magnetic bond will not permit any leaching or erosion to take place. It will hold the soil nutrients and moisture, and prevent the rain, sun and wind from taking them out. The fertilizers that are applied stay there until the crop uses them up. This is the reason that soft rock phosphate and lime should be applied first, before any other elements, in a good fertilizing program. Then the fertilizers applied later will not be wasted.

Have you ever seen dust blowing off a field - that is, regular dust storm, with 15 to 20 mph wind? There have been fields, large fields, in March and April, when the wind was blowing 25 to 35 mph, without a bit of dust on them, except that which blew in from other fields. The protoplasm in the soil kept it from blowing away.

Soft rock phosphate also does for the soil what baking powder does for dough. When the sun strikes the soil, it makes it rise and aerates it. When it aerates the soil, it takes the bacteria down deeper and allows the oxygen to filter down in, thus increasing the top soil depth. Whenever a soil is very hard, compact or hardpan, the sodium content in the soil is too high. Sodium is the element in the soil which causes compaction. The use of soft rock phosphate will counteract this high sodium, and will pulverize the soil. Dr. Reams has seen hardpan, like the Mississippi Valley has (so hard that the soil is like a rock), on which soft rock phosphate has been used. The soft rock phosphate pulverized the soil and made it just as loose as a farmer could wish it to be.

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