

taining a high content of phosphoric acid is not necessary because the amount removed in the clippings is only one-third to one-half as much as nitrogen or potash.

Muriate of potash is the principal material used to supply potash. The United States product contains 60 to 62 percent of potash. Before the discovery of potash minerals in this country, Germany was the principal producer of potash fertilizer, and after World War I France produced a limited amount from mines in the area formerly held by Germany. The European product contained 48 to 50 percent of potash.

There is a limited production of potassium sulphate. It is made from the muriate and is higher priced per unit of potash. The sulphate is used on specialized crops, such as tobacco, where chlorine has a bad effect upon the burning quality of the leaf. There is no evidence to show that the sulphate produces better results on grass than the muriate.

Phosphoric Acid Sources

Super phosphate is the principal source of phosphoric acid. It is produced from rock phosphate by treatment with sulphuric acid. The resulting product is a mixture of monocalcium phosphate and calcium sulphate or gypsum. The phosphoric acid content varies from 18 to 45 percent. The ones of high phosphoric acid content are made by treating the rock with phosphoric acid instead of sulphuric. Bone meal is another good source of phosphoric acid. It contains 20 to 27 percent phosphoric acid. The ammonium phosphates are the other class of phosphate fertilizers. They contain both phosphoric acid and nitrogen. The two principal grades are 16-20 and 11-48, although several other analyses are in prospect. The first figure represents the percentage content of nitrogen, and the second the phosphoric acid.

There is a larger variety of nitrogenous fertilizer to choose from. They are divided into the organic and mineral or inorganic forms. The organics should be subdivided into the natural organics and the synthetics, which are manufactured from atmospheric nitrogen. The natural organics are plant or animal residues. They include manures, dried blood, animal tankage, hoof meal, cottonseed and soy bean meal, processed leather, and sewage sludges. They vary in plant food content and in the availability of the nitrogen. The synthetics are cyanamid containing 20 percent, and urea with 40 to 45 percent nitrogen. "Uramon" is the trade name for a urea product guaranteed to contain 42 percent nitrogen. The nitrogen of cyanamid is converted to urea in the soil. Urea is transformed into ammonium carbonate so cyanamid and urea are more like the inorganic forms of

nitrogen than they are the natural organics.

Principal Inorganic Nitrogen Sources

The principal inorganic nitrogen fertilizers are ammonium sulphate, containing 20 percent nitrogen, and nitrate of soda, containing 16 percent nitrogen. A new one gained prominence during the second World War, although there was a limited production before then. It is ammonium nitrate, containing 32 percent nitrogen. "Cal-nitro" is the trade name of a nitrogenous fertilizer containing nitrogen in the form of ammonia and nitrate. It was made in Germany before the war.

Ammonium sulphate has long been a favorite quick-acting nitrogenous fertilizer for use on grasslands. It is preferred by golf clubs because of its tendency to check clover and weeds. It tends to make the soil acid. That property was considered advantageous in the early days, but not now. The judicious use of lime is advised to prevent the soil from becoming too acid.

Nitrate of soda is another inorganic, water soluble and hence quick-acting fertilizer. It received a black eye because of the weeds on the nitrate treated lawn plats at the Rhode Island Experiment Station.

Ammonium nitrate is an excellent material and may have some advantages over sulphate of ammonia. It has the same effect on weeds and clover and provides both kinds of water soluble nitrogen. Ammonium nitrate is hard to handle unless it has been processed properly, because it is highly hygroscopic, which means that it absorbs atmospheric moisture. When exposed in very humid weather ammonium nitrate absorbs enough moisture to become liquid. Manufacturers granulate it with kieselguhr and coat the particles to stop moisture absorption.

DETROIT D.G.A. APPROPRIATED \$2,500 FOR TURF RESEARCH

The sum of \$2,250.00 was appropriated from the surplus funds of the Detroit District Golf Association at a recent meeting for the purpose of establishing a graduate fellowship at Michigan State College, East Lansing, Mich., for the study of Turf Research. This sum will be payable in three equal installments annually on the first day of August to the Green Section of the USGA, which will in turn transmit it to Michigan State College, and its use shall be supervised by the USGA.

This grant is made in consideration of a like amount being given to Michigan State College by the Midwest Turf Foundation for the same purpose, to the total amount making the fellowship possible.