

Liquid Fertilizers

*Their use in foliage sprays
and seed applications*

Virgil L. Weiser
Extension Agent Soils

Case
S
544.3
.N9
A8
no 252

NDSU LIBRARIES

NDAC *Extension Service, Fargo*

NORTH DAKOTA AGRICULTURAL COLLEGE

LIQUID FERTILIZERS

Requests are received frequently for information concerning liquid fertilizers in general. Sometimes, information is requested on specific brands that are recommended for use by the manufacturer as foliar sprays and/or for wetting the seed before planting.

Liquid fertilizers are being made with various nutrient combinations for regular soil application as well as those proposed for special purposes.

LIQUIDS CONTAINING ONLY NITROGEN

Gaseous anhydrous ammonia, (which is sometimes classified as a high pressure liquid), low pressure liquids (water solutions) and non-pressure liquids (also water solutions) as forms of straight nitrogen fertilizer have been described and discussed in Extension Service Circular A-242 "Forms of Nitrogen Fertilizer". Some of these, especially anhydrous ammonia and a 32 percent nitrogen non-pressure type, are being sold and used on a limited scale in North Dakota.

LIQUID MIXED FERTILIZERS

In states south and east of North Dakota a recent development has been the establishment of small liquid fertilizer plants that make up water solutions of fertilizer materials in various combinations of the three nutrients, nitrogen, phosphorus and potassium, to fit various crop and soil conditions. The liquids are delivered within a usual radius of about 30 miles from the plant. Within the approximately 30-mile radius it is possible to compete in price with other forms of fertilizer. Such developments have not as yet reached North Dakota.

In some irrigated areas, similar liquid fertilizers are used by adding to the irrigation water as a field is being irrigated. The foregoing liquids are priced so they are comparable in cost with other forms of fertilizer.

LIQUID SOLD FOR LEAF FEEDING AND SEED TREATING

Liquids are being sold in North Dakota under several brand names as both straight nitrogen material and mixed fertilizers for leaf feeding or seed treating methods of application. These are water solutions of soluble fertilizer material. The usual price charged per gallon makes the cost per pound of nutrients several times that of the same nutrient in dry forms of fertilizer.

LIQUIDS VS DRY FERTILIZERS

The water solution liquid fertilizers differ from dry solid forms only in that the fertilizer salts have been dissolved in water. A dry crystal salt form, such as ammonium nitrate, may be dissolved in water. When dissolved it becomes a liquid fertilizer. The mere fact that it is dissolved in water does not necessarily make it more valuable than it was as a dry salt, nor does it mean that less of the nutrient nitrogen contained is necessary for plants when used as a liquid.

Pound for pound of plant nutrients contained, dry forms of fertilizer containing nutrients in available form should be equal in effectiveness to liquid forms. An advantage in liquid forms over dry is that labor is saved in handling sacks as liquids are transferred by pump or gravity flow. There are some differences in equipment available for placement that may limit conditions under which liquids can be used.

METHODS OF APPLYING SOIL APPLICATIONS

Where fertilizers are to be broadcast on or in the soil separate from seeding, equipment is available to handle liquids and gaseous forms as well as dry materials. Attachments for applying liquids in the row at planting have recently been developed for row crop planters. Attachments for applying liquids in the row with the seed have not yet been developed for grain drills.

Such lack of equipment for placement of liquids containing phosphate fertilizer in close seeded crops would be a disadvantage under North Dakota conditions. North Dakota trials on methods of applying phosphate fertilizers to wheat have shown that broadcast applications need be 2 to 4 times as large as row applications to give equal response in crop yields.

WETTING SEED WITH FERTILIZER SOLUTIONS

The method of wetting the seed with liquid fertilizers before planting, as recommended by certain manufacturers, led to the carrying out of several trials in North Dakota comparing the method and rates proposed with recommended rates of regular fertilizer as soil applications.

In most cases no significant increases in yield for the seed treatment method were obtained while regular soil applications gave significantly increased yields. Apparently not enough fertilizer is carried on the seed to influence the crop to the extent that measurable increased yields are obtained.

FOLIAR APPLICATIONS

Leaves and stems of plants do take up nutrients from sprays or dusts. With some woody species of orchard crops fertilizers used as leaf spray applications are being effectively used to supply the needs of the crop at critical periods of growth.

Some experimental work has been done with usual farm crops, of cereals, forages, etc. However, the applicability of this method for such regular farm crops has not been established. Stations that have conducted work with the method on field crops have concluded, so far, that it is not a practical means of supplying the fertility needs of such crops.

For North Dakota, with spring sown grains and other crops, we obtain considerable of the beneficial effect of the soil applied fertilizer in early stages of growth--seedling and stooling stages. Foliage sprays applied after the crop is up and covering the ground are too late to obtain these early effects.

For these reasons regular soil applications of fertilizer at planting time, or before are recommended.

However, if the needed fertilizer was not applied to the soil, and later in the season the crop shows signs of needing fertilizer nutrients, furnishing such nutrients through leaf sprays will likely give increased yield.

Cost per pound of nutrient and an analysis that supplies the needed nutrients are two factors to consider in selecting a liquid fertilizer for such applications. The needed nutrients have to be supplied in somewhere near adequate amounts in order to significantly influence yields. There is danger of burning the leaves if too large amounts are applied in one spray. Several separate spray applications may be necessary to provide the amount needed. Not enough is known about safe rates of application. If you plan to fertilize a crop it is safest, and with present knowledge considered most efficient, to make the regular recommended soil applications.

Extension Service, North Dakota Agricultural College and U.S. Department of Agriculture Cooperating. E.J. Haslerud, Director, Fargo, North Dakota
Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914.