

Grand award winner looks at . . .

Why We Use FERTILIZER

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AS American farmers and others connected with farming, let us stop and think why we are using more fertilizers in this day and age. Hundreds of years ago when our forefathers came to this country, they did not use fertilizers. They farmed their land until the crops they grew were no longer up to par. When this condition developed, they would sell their land and move on, rather than attempt to solve their problems.

After they sold their farms, they moved westward and found new land which they destroyed as they had the last. This went on year after year. Now we cannot move, but we can build up the land we now farm through fertilization and soil conservation.

We started out with approximately nine inches of top soil and we have depleted it to six inches and even less in some areas. What will fertilization do for your farm or ranch? One of the most important things that it will do is to build up and conserve your land. The American farmer can make more money through fertilization. For example, if he is growing a vegetable crop, his product is consumed by the housewife and her family. When the housewife buys her vegetables, she looks for large, lush, well-developed vegetables. If these vegetables have been properly fertilized, they will appeal to her eye. The result will be more money in the farmer's pocket through the use of fertilizer.

The use of commercial fertilizers on a farm should blend in with crop rotation, green manures and stock yard manures. These things, properly applied, will build up the land and preserve it for the years to come.

George Washington was an early user of fertilizers in his experiments in the field of agriculture, but it was not widely used until many years later.

In this report I will relate to you information concerning fertilizers applied to the following crops: rice, potatoes, cotton, sugar beets and lettuce. These are some of California's leading crops.

In California, fertilization of rice crops is a common practice, except on quite fertile farms and new lands, which is a small proportion of California's land. Nitrogen fertility results when rice follows a legume, such as burr or ladino clover. Nitrogen is the key plant food for rice and gives favorable response. It is said that phosphorus may be needed on red soils along the eastern edge of the Sacramento Valley.

Our chief rice-producing areas in California are the Sacramento and San Joaquin Valleys. These soils are mostly heavy and only nitrogen is used here for profitable response. No farmer should spend money for something that will not bring him profitable returns.

Submerged rice fields take in nitrogen from the soil in the form of ammonia, so it should be applied in the form of sulphate of ammonia, urea, or cyanamid. Rice does not respond well to nitrate fertilizers when grown under continuous submergence. The rate of fertilizers applied varies with the fertility of the soil. We must take into consideration that no two soils are the same and, therefore, the methods of application must differ.

An average acre that is producing 35 sacks of rice per year without fertilization could be made to produce more with the application of 150 pounds of sulphate of ammonia. On land of lower fertility, and which produces about 20 sacks of rice without fertilization, 250 pounds of sulphate of ammonia should be applied. If production is 45 sacks or more per acre, fertilization is not necessary that year, for fertilizing rich land may delay maturity and increase sterility.

The time to apply fertilizer is from the time of seeding up to 65 days thereafter for good results. Fertilizing after seeding is done by airplane. Fertilizing at the time of seeding increases the rate of growth and the vigor of the young seedling. It is unnecessary to lower the water when applying fertilizer. Apparently there is no loss from the field through water drainage.

A farmer can produce eight tons more rice by applying sulphate of ammonia to average land. Fertilizing through irrigation water is not being practiced because of uneven distribution of nitrogen. The use of cyanamid should be made only on dry soils before seeding so that the period of toxic effect will be over before the seed germinates.

The examples I have given on the fertilization of rice are both inexpensive and profitable.

Potato farming is growing rapidly in California. We look to high yields per acre and in order to accomplish this we need high soil fertility. Experiments have been made in Kern County which show that an average crop of potatoes removes 125 pounds to 200 pounds of nitrogen, about 60 pounds of phosphoric acid and 300 pounds of potash per acre.

Our soil in California cannot meet these requirements of nutrients so we must fertilize. Manures and cover crops can be used to build up soil, but potatoes are largely dependent on inorganic nutrients or commercial fertilizers. Tests have been made in other counties, but what is effective in one area will not always be profitable in another.

For example, Kern County uses 100 pounds or more of nitrogen per acre. (500 pounds of ammonium sulfate contains about 100 pounds of nitrogen.) In a lighter soil, such as that around Fresno, up to 140 pounds of straight nitrogen are used on the spring crops, and half of this amount for the fall crop. In all areas, fertilizer with some phosphorus should be applied.

On the peat lands, 500 to 1,000 pounds of 10-10-10 should be applied on the older fields. On newer peat lands, you can use 0-10-10. Always remember that no two fields are the same. Ammonium sulphate, here again, is the best form of nitrogen, but could be used with blood-meal, half and half. Cyanamid has proved toxic, as little as 60 pounds of nitrogen per acre from this material showing toxicity throughout the entire growing season.

Applying fertilizer to potatoes should be done at time of planting seed pieces. Methods of application may vary somewhat, but an attachment to the planter works about the best. The fertilizer should be applied one inch

below and two inches to the side of the seed.

Lettuce is one of California's large and profitable crops. The farmer strives for firm solid heads of lettuce, for that is what the consumer wishes to buy. To do this the crop needs proper irrigation and cultivation. But without fertilization, here again, he will not reach his goal. Soil fertility must be maintained.

The largest lettuce areas in California are Imperial Valley and the Central Coast areas. Our lettuce areas are limited, so we must keep them productive. In maintaining soil fertility, crop rotation is a good idea. Farmers use no one set system of crop rotation, but crops that can be used are alfalfa, cantaloupe and flax. Alfalfa, which is a legume, is a nitrogen builder. If followed by a shallow-rooted crop, this makes a good crop rotation.

Barnyard manures are good on poorer land. Ten tons to the acre will increase yields up to 54 per cent and lettuce will mature two to four weeks earlier. Green manures are valuable in lettuce production, and increase soil fertility. However, green manures, barnyard manures, organic matter and crop rotation are not enough. There is yet a need for commercial fertilizers.

On lettuce, the three main plant foods are needed—nitrogen, phosphorus and potassium. Nitrogen can be applied in the inorganic form from sodium nitrate, ammonium sulphate, ammonium nitrate or calcium nitrate. Organic forms are urea, tankage, fish meal, cottonseed meal and dried blood. Phosphorus and potassium will not move much in California soils, therefore *they should be applied deep in the bed where the soil will maintain moisture, so the roots can develop in the region of the fertilizer*. There is no one type of fertilizer that can be used on this crop, for all soils are different.

When planting lettuce, fertilizer should be applied one to two inches below the seed and two to three inches beside the seed row. This can be achieved by the seeder. Just remember that with proper fertilization you can obtain the type of crop you are after.

Sugar Beets are another of California's important crops. If a farmer intends to get large yields, he must apply fertilizers. For example, applying 240 pounds of nitrogen, he can get a net gain of \$250 per acre. But nitrogen is not the only key plant food for sugar beets. A complete plant food such as 8-10-12 is desirable for many of our soils. The selection of the proper kind of fertilizer is of great importance.

With any crop, the efficiency of the fertilizer you use depends on the kind of material, time of application, placement of material with respect to the plant roots, and the rate of application.

Sugar beets are relatively a deep-rooted crop. Tests have proved that the application of fertilizer five or six inches deep at the time of thinning is quite profitable.

Besides the plant foods listed, others that are needed are calcium, magnesium and sulphur in substantial amounts. Others that are used in smaller amounts are boron, zinc, iron, and copper.

Cotton was the leading crop of the south, but with improper use of the soil, the land was soon depleted, and the crops yielded less and less. Now, through proper fertilization, California has become a leading state in the production of cotton.

Does your cotton need fertilizing? The answer is yes! Nitrogen, phosphorus and potash is needed along with micro-elements such as copper, magnesium and zinc. Although there is generally an adequate natural supply of micro-elements in our soils, in some cases they are still needed. The amount of fertilizer you need is based on original soil fertility, cropping and soil fertiliza-

tion history, soil management and seasonal conditions.

In general, there is usually enough potash in the soil for cotton. An average amount of fertilizer, depending on what type of soil you have, can be supplied by any number of commercial materials. The distribution can be in bands and sidedressings or broadcasting. Broadcasting is done on the soil surface and through diffusion moves into the soil. If using it in bands, it should be done at the time of planting, three inches to the side of the seed and two inches deep. If the plants are already established, place it to the side of the roots so there is no danger of injury from burning. If broadcasting is used after the time of planting a good deal of water is used to get to the root area. Through the proper type of fertilization, your cotton crop will be increased by many bales.

In this report I have brought out certain conditions and have given examples. No two soils are the same, and there can be plant foods in the soil that are not available to the plant, so we must fertilize. Taking these facts into consideration, the proper use of fertilizer will bring the California farmer more dollars per acre. ◀◀◀

K₂O Hunger In California

Soils in many areas of California are becoming deficient in their native supply of potash, California farmers were recently informed by the California Fertilizer Association.

This development is being caused primarily by *consistently heavy-cropping*. Another factor, showing up with increasing frequency in specific crops, is the *difference in plant food appetite of the various crops*.

To show the difference in vegetable crop uptake of plant food elements, the Association pointed out that Irish potatoes (tubers) must take up from each acre of soil 108 pounds of nitrogen, 42 pounds of phosphoric acid (P_2O_5), and 192 pounds of potash (K_2O), to produce 500 bushels.

Lima beans require 95 pounds of nitrogen, 24 pounds of phosphoric acid, and 113 pounds of potash for a production of one ton.

To produce 350 crates of celery, the soil must have these supplies of plant food elements in a form available for the plants to take them up: 80 pounds nitrogen, 65 pounds phosphoric acid and 235 pounds of potash.

In Madera County, California, application of potash to Ripperdan soil has increased the yield of potatoes by about 66-100 pound sacks per acre. These experiments, under the direction of County Farm Advisor Clarence Johnson, have included rates of potash applied ranging from 150 to 400 pounds actual K₂O per acre. They indicate that the soils which test lowest in available potash will generally increase crop yields when an adequate supply of potash is applied.

The Association recommends the local fertilizer supplier as a reliable source of information concerning soil fertility and plant nutritional problems in the area which he serves.