Fertilizer for Citrus Trees

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The value of commercial fertilizers in relation to the citrus industry has passed the experimental stage. The question is no longer—"Are commercial fertilizers good and useful?"—but—"In what form or combination of materials will they produce maximum profitable results?" Agricultural chemicals, therefore, now occupy a position of prime importance, not only as to actual effect upon farm prosperity, but also as to the actual amount of cash which the grower has to spend; for his produce comes out of the soil and its amount and quality are most often largely dependent upon and determined by, the character of the plant food he puts into it. This offers a most complex problem, associated as it is with many essential and fundamental conditions of soil, climate, rainfall and method of cultivation; for, unless these conditions are satisfactorily met in every respect, crops are unable to make efficient use of the plant food within their reach.

During the war it was imperative that the crop yield of the country be vastly increased. And in view of the high cost of materials and labor, it is yet an imperative problem, the answer to which can only be found in improvements in all farm operations and in a vastly greater use of fertilizers, this being of the highest economic importance.

The three main elements of plant food, nitrogen, phosphorus and potassium, carry their own problems. The results already secured by the chemists have rendered the exhaustion of natural nitrate deposits no longer a cause of anxiety, although even today the process of obtaining nitrogen from the air is stated to be less than 5% efficient. The extension of this process has been one of the remarkable events of the war, but it will probably be a long time before nitrogen from this source can be given to the farmer in such quantities, and at such a price, as to make possible its extensive use. What can be done through the means of the electric furnace in the recovery of phosphoric acid is not so well proven, but there have been achievements in this field which point to large possibilities. The potash problem has occupied a major position in the agricultural field, but it has been solved to such an extent that, except for the first few months of the war, potash has been available in both quantity and quality. In addition to the many natural sources of potash that have been developed through the necessity of the past four years, there are great possibil-
ities of the recovery of potash from waste gases of cement plants and gas furnaces; it being stated by some authorities that by the development of this source the possible recovery of potash could be made to equal the pre-war consumption of the United States.

Unfortunately there still persists an impression that the fertilizer manufacturers have but a small supply of potash, and in some quarters it apparently is believed that the manufacturers themselves are fostering this impression. This is certainly not the case, for it was only during the first few months of the war that there was any restriction at all on potash. For a very brief period most manufacturers limited the amount of potash to from 3 to 5%. That, however, was only a temporary restriction very quickly abandoned and for the past three years any grower in Florida could at any time purchase as much potash as he wanted. The demand fell off naturally on account of the rise in price, coupled as it was with the increased cost of the other plant food elements and not because there was any lack of potash. And this American product has proved just as good as any that ever came out of foreign deposits.

During the first year of the war, recommendations were made to the growers to greatly lower the potash content, and in many instances eliminate it entirely because of the cost and the fact that a plentiful soil reserve was undoubtedly on hand. The basis for this, particularly with reference to citrus trees, was tank experiments made at Gainesville, in which it was demonstrated that practically no potash leached from the soil for the first three years, although a great deal more was applied than the trees could possibly use; but that after the third year the potash began to leach away quite readily. This shows without a doubt that the soil can contain a considerable quantity of potash, but that it eventually becomes saturated. For the past year, therefore, the growers have been cautioned that they have drained heavily on these reserves and must supply potash to their trees if they expect maximum results. If they are going to economize on their fertilizer at any time of the year, the best authorities have recommended that it is preferable to omit the potash in the spring application, bearing in mind that it is especially necessary to use complete fertilizers in the summer and fall. These recommendations are particularly for bearing trees, the use of potash in the spring not being generally advised on young trees except in those instances where they had had no potash during the preceding year. It is generally admitted that young trees can do well with very little potash.

No one knows how little potash is necessary for good results, for until the war potash was always easy to get, and cheap. Due to German propaganda the farmer had insisted upon more potash than even government scientists or fertilizer manufacturers advised, and there is no question but that more was advised than was actually necessary. As a result of the enforced necessity of using small applications of potash, the fallacy of using standard pre-war applications became in-
creasingly apparent to the majority of growers and it is believed by many that we will never get back to complete fertilizers carrying from 10 to 15% potash; and that from 5 to 8% will probably be as much as any grower will require. Some authorities state that were potash cheap again they would advise 2 or 3% in the spring, 4 to 6% in the summer, and 4% in the fall. This, however, is something that must be determined by some years of actual experience. Potash is absolutely essential, and there is no question but that a lack of it shows in angular, underdeveloped twigs, thinner, less crisp leaves and a decided flatness in the flavor of the fruit. Potash particularly gives firmness of tissue, and therefore has great influence on the shipping qualities of fruit. At the same time it is not a “cure-all” in this particular, for with the heaviest applications of potash, climatic conditions and the general handling of fruit can cause enormous loss. As indications are at present, the fertilizer used by citrus growers this summer is going to average about 3½% potash. A great many of them are taking 5%, some of them as low as 2%.

Without doubt, 6 to 8% phosphoric acid is all that vegetable growth needs as a plant food, but phosphoric acid encourages all plant activities. An excess of it will help to relieve a lack of some of the other essentials, not in any sense of the word taking the place of these essentials, but by its presence making the supply more largely available.

It is regretted that the general tendency was to use only 4% ammonia this spring because of the high cost of fertilizer. It is generally conceded that under ordinary conditions the tree needs 5% ammonia in the spring, 4% in the summer and 3% in the fall. The minimum amount of ammonia required has been pretty definitely determined, for ammonia has always been the most expensive part of fertilizer except for a short period about four years ago. For instance, by state valuation ammonia used to be put at $3.65 per unit, and generally cost more than that, while potash and phosphoric acid were put at $1.00 and could be bought for less. Growers have always tried to get along with the least ammonia possible, and therefore the minimum has been very definitely established.

The proper proportioning of ammoniates is essentially important, there being a very great exactness possible in so planning and combining the ammoniates as to give a steady supply of available ammonia with the least possible waste. The time of availability is largely dependent upon temperature and moisture, points which can not be readily foreseen. But these also have effect upon the plant, so that the two generally keep in pretty good proportion. The plant grows faster and uses more plant food under such conditions as bring the plant food more quickly into availability. Therefore, fertilizer made on a general average, and used in an amount sufficient to supply the requirements of the tree, will give the best results. This amount is based on the size and condition of the tree and on both past and future crop. It has been accepted that a bearing tree requires fer-
tilizing three times a year, this being based on the growth in the spring, the growth in summer, and the root development in the fall. Naturally, there will always be present conditions requiring special treatment as to fertilization. But the best average results have heretofore been attained through the use of an average blend of the best grade of materials, the success being only in proportion to the skill with which the requirements of the tree were met.

Unfortunately the general tendency among the majority of citrus growers is to use fertilizers in too small amounts. It is not often that they make any kind of a test to learn what amounts of fertilizer they can use most profitably; nor do they take much advantage of the information compiled for their benefit through laborious study and effort on the part of the State and Federal Agricultural Departments, based upon years of scientific research and practical experience. This information, which applies not only to fertilization, but to general grove culture, and the control of insects and diseases, if studied and followed intelligently by the large majority, who are still clinging to old ideas and methods, would revolutionize the citrus industry in this State on a scale that would add millions of dollars to the pockets of these growers.

In conclusion I would urge each and every grower to study the bulletins which are supplied free of charge by the Experiment Station at Gainesville, with the determination to fertilize for maximum results, supplementing this with the best methods of grove culture, for, only by so doing can the desired results be obtained.