NEED FOR LIME AS INDICATED BY RELATIVE TOXICITY OF ACID SOIL CONDITIONS TO DIFFERENT CROPS.¹

BURT L. HARTWELL.²

The main purpose of this paper is to emphasize that the kind of plant to be grown determines, more than any other factor, the amount of lime to apply to the soil; in other words, it is concerning the lime requirement for an acre of a given crop plant that agronomists are called upon to advise. The term “lime requirement” is understood to refer to the amount of calcium carbonate, or material with equivalent alkalinity, required to counteract other than nutrient effects resulting from soil acidity, which may be detrimental to crop growth.

It is not to improve mechanical condition, to influence soil flora or fauna, nor to supply, directly or indirectly, strictly plant food ingredients that attention is given to so-called lime requirements. Only when the conditions resulting from these other factors are optimum can the relative lime requirements of different crops be determined by growing them upon an acid soil. Considerable confusion has arisen because mechanical or nutrient effects have not been eliminated when such comparisons have been made. It is the alkaline or neutralizing effect on the plant itself, or on the nutrient medium in which it grows, that it is desired to measure.

The interesting questions relating to just how the alkaline materials exert their effects, and to what extent calcium may be replaced by other alkaline elements, are largely avoided in this paper in order to observe more clearly the practical considerations connected with the lime requirements of crops.

Unless one has observed the comparative effect of lime on crops which are extremely different, the importance of this consideration is liable to receive less emphasis than it should. As examples of pairs of crops which are similar in many respects, yet very different in their lime requirements, mention may be made of watermelon and muskmelon, blackberries and raspberries, apple and quince, turnip

¹ Contribution 274 from the Agricultural Experiment Station of the Rhode Island State College. Presented at the thirteenth annual meeting of the American Society of Agronomy, Springfield, Mass., October 19, 1920.
² Director and agronomist, Rhode Island Agricultural Experiment Station.