How Agricultural Research Can Help the Golfer

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It is a great pleasure for me to have a chance to talk to you very briefly this afternoon. I am an ardent golfer, although I think I am one of the world's worst. My interest in the Green Section has been agricultural rather than because of any skill in the game.

The problems of the Green Section in many ways are closely allied to the problems of the United States Department of Agriculture. I have felt that the Department's cooperating with the Green Section might be looked upon by some of you as an absurdity, but I am hoping to be able to present a plausible explanation to the golf specialists as to why they should be interested, and constantly interested, in carrying forward thoroughgoing research in the problems of growing grass and other plants desirable for golf courses.

Agriculture is one of the oldest occupations of the human race; and yet it is remarkable to find how few of its questions can be answered definitely for present-day farmers. In this country the problem is even more acute, because we are here dealing with a country only recently brought under the modern development of agriculture. The older population of America, with its hunting and other habits, generally had few crops that were cultivated and therefore had no experience which taught them how to handle extensive crops. I do not know how many of you appreciate that tobacco and corn are almost our only important crops wholly developed in this country. Most of our great cereal crops, vegetables, and ornamentals are of European origin, transplanted to this country in comparatively recent years. In this transplantation these crops have come to regions widely different from those in which they had developed—widely different in climate, soil, and the methods that necessarily would be utilized in their development. Accordingly very many difficulties have developed, unexpected difficulties, difficulties that could not be solved by relying on European experience. Through the extensive experimentation on the behavior of crops under different conditions, first the experimentation of such men as George Washington, Thomas Jefferson, and other leaders in the Nation's life, and later through the more definitely official recognition of the importance of experimental work in the establishment of the agricultural colleges throughout the country and the United States Department of Agriculture, the problems of crop production were realized to be more and more difficult. In time, however, these problems began to be better understood—these problems of the most elaborate study and development of plants, under what conditions they would do well, under what conditions they would suffer. From all of these studies there has accordingly arisen a more modern type of agriculture and crop production the importance of which is increasing instead of decreasing, so that the oft-repeated statements regarding the worn-out lands and the rapidly wearing-out lands of agriculture can be set down as idle theories of a bygone generation.

There has been a steady increase in yields per acre as well as in

quality production in the United States. In connection with these studies, a few of the more recent lines seem to me to bear very directly upon the behavior of grass and the methods of grass maintenance. In the fertilizer studies, perhaps no crop is quite so useful as tobacco for detailed studies, since the quality of the leaf, as well as its size and appearance and weight, are matters of fundamental importance in the value of the crop to the producer. The fertilizer studies on tobacco, therefore, at the present time, I believe have been carried to a greater degree of perfection than in the case of any other crop. Within the last decade what I might call the old method of fertilizing tobacco has been pretty well exploded. More care in the component fertilizer materials is found to be necessary, and substances that until very recently had not been included in the fertilizer mixtures have been found essential. For example, a peculiar kind of disease called sand-drown has been troubling tobacco growers for many years in the coastal plain region of the country. The term sand-drown was used because the disease appeared especially on sandy soils and was more pronounced following unusually heavy rains. This explanation of the disease, however, seemed absurd, because under such conditions the tobacco on sandy land would seem less likely to drown than the tobacco on the heavier lands. But at least sandy lands were the places where the disease appeared. A long and ingenious series of experiments that would take me too long to detail to you, finally showed that the disease is the result of a deficiency of magnesium salts in the soil, and that in the sandy soils, where the magnesium was in comparatively small quantity, these heavy rains would wash out the slight traces that were there, and then these diseased spots in the tobacco leaves would appear. Also, from some early experience in the use of potash fertilizers there had been a gradual development of the idea that sulphate of potash was a fertilizer necessary for quality in tobacco. Chloride of potash would give the same or greater bulk in the tobacco crop, but a poorer burn. The leaf was not of as good quality. The use of sulphate of potash went a little too far. It now appears certain that if sulphate of potash is used exclusively and for a period of years, so that the chlorides in the soil are reduced too far, then the yield suffers, and the quality also.

The same problems in Florida have brought to light more unique fertilizer materials. In certain parts of Florida, the use of salts of copper and manganese is essential for proper crop production. Minute quantities only are needed, perhaps only a few pounds to the acre.

Thus it is that the fertilizer problem is being made very much more complex as time goes on. The more we know about it, the more complex we can see that proper fertilizing is bound to be.

I have gone into the tobacco problem at length because we know a little more about tobacco fertilizing than we do about grass fertilizing. We are, I think, barely starting on our understanding, not only of the needs of turf grass in general but the different needs of the different kinds of grass. From what we know of the behavior of such crops as cotton, tobacco, and corn, we can predict with certainty that the different grasses are going to need different kinds of compounds for their best development, and that under the different soil conditions, possibly also in different climates, these compounds will have

to be varied to bring about the most healthy growth of turf and correspondingly the greatest freedom from disease.

The disease problem is not necessarily connected with the vigor of the growth of turf or of other crops. There are some diseases which can attack a crop more successfully that is growing luxuriantly than if it is more or less stunted; but a large number of the milder diseases, and especially the milder root parasites, are dependent to a very large degree for their opportunity to injure these plants on a subnormal condition of the plant itself, and this can be brought about by unwise use of fertilizers or unbalanced fertilizers, as well as by drought, or drowning from too much rain or too heavy watering.

So we find a need for the closest possible cooperation in these difficult and unknown problems. Even the farmer in the long run is going to benefit from the very close cooperation that has existed, and that I hope will continue to develop, between the United States Golf Association and the Bureau of Plant Industry. If, through the keen interest in turf production and turf maintenance, these researches will give us a similar knowledge of grass management as we are now securing of tobacco management, then these same ideas can be applied on pasture lands, lawns, and other parts of the farm and homestead, no less than on the golf courses.

I want to add one word of caution, however. Because work is done scientifically, it does not mean necessarily that it is going to be done rapidly. I think much excellent work is spoiled by a desperate attempt to reach conclusions too suddenly and before the problems are thoroughly understood. In urging more attention to research problems, I wish to appeal to all of you not to be insistent on immediate application of results, and especially do not feel that the work is useless if such application of results shows that the work was not sufficiently understood and that parts of it may have to be done over again.

Colloidal Phosphate as a Fertilizer

From time to time the Green Section receives inquiries as to the merits of colloidal phosphate as a grass food. One of the most common phosphatic fertilizers is superphosphate, previously widely known as acid phosphate. As far as we have been able to ascertain, there appears to be no difference between grasses and farm crops in their utilization of different forms of phosphate. The evidence available however indicates that grass requires relatively less phosphate than do many of the farm crops but shows no special preference for any certain form of phosphate from which to obtain its supply. A rather complete estimate of the value of colloidal phosphate as a fertilizer has been published by the Massachusetts Fertilizer Control, in its 56th report, in Bulletin 51 of the Massachusetts Agricultural Experiment Station, Amherst, which appeared under date of November, 1929. Its report on colloidal phosphate is quoted below. In this report we wish to call special attention to the difference in cost of colloidal phosphate as compared with superphosphate. This difference is even more striking when one takes into account the relative percentages of phosphoric acid contained in these two forms of phosphorus, and its relative availability. In discussing colloidal phosphate the report says: