THE SIZE OF EXPERIMENT PLOTS FOR FIELD CROPS.

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It is unquestionably true that the size of plots in field experiments has much to do with the accuracy, value and importance of the results. There are so many variable factors over which we have little or no control concerned in the making of such tests that the experimenter must always exercise the greatest care in eliminating as many of them as possible if his results are to be reliable. Among the most common of these factors are drainage, surface topography, soil ventilation, chemical composition and differences in soil texture due to variable amounts of humus, stone, gravel, sand and clay. All of these factors modify to a greater or less extent the habitat of the soil bacteria, and the influence of these, we now believe, is a potent one affecting the fertility of a given piece of land.

Field experiments fall naturally into three classes, namely, fertilizer tests, variety and breeding tests, and soil tests. Of the three variable factors concerned in these, two must always be assumed as constant in any given experiment. For example, with a fertilizer test we must have homogeneous seed and uniform soil; with a variety or breeding test we must use similar fertilizers on the same kind of soil; while with a soil test our fertilization must be uniform and our seed or plants identical.

Since the basis of all field tests is primarily the soil, and since the soil, from the nature of its mode of formation, is in general a very ununiform product, even over small areas, the question arises, on how large an extent of this soil can we secure conditions which will give us reliable and comparable results?

This question is not an easy one to answer, because much will depend upon the degree of uniformity and upon the frequency and extent of the most obvious and influential changes in the soil. Certain parts of the country have more uniform soil conditions than other parts, and certain experiment station farms have less variation in their soils than certain other ones, while certain fields of some stations are less variable as regards soil than other fields. Those of us who have had to do with field tests in New England, where on many farms it is scarcely possible to find an acre of ground without a ledge or a mudhole in it, can appreciate some of the difficulties of the situation.

It seems to the writer that the general proposition may be laid down that the size of plots should vary inversely with the degree