STUDENT'S METHOD AS APPLIED TO FIELD DATA COVERING A PERIOD OF YEARS

WARD H. SACHS

Experiment station workers are constantly striving to improve their methods in order better to arrive at true results, so that more confidence may be placed in the results obtained.

Agronomists and horticulturists necessarily carry on many field tests. Variations in yield, even of adjoining rows of the same variety of a crop, during the same growing season, are not unexpected. Yields of adjoining plots of an experimental field treated in the same manner in all respects are almost sure to vary somewhat. During a period of years the variation in yield of the same plot, treated in as nearly the same manner as possible, is indeed often quite marked.

In order to determine the reliability of an increase of a certain variety or soil treatment over another, various mathematical formulae have been suggested to be used as an aid in the interpretation of the data. A mathematical process for handling experimental data, which has received considerable attention during the past few years, is "Student's Method" (1).  

Valuable discussions of Student's method by Love (1) and Love and Brunson (3) are to be found in this JOURNAL. Salmon (4) in a very illuminating article has pointed out some misapplications and limitations in using Student's method to interpret field experiments. As a number of experiment station workers are adopting this method, a further study seems desirable. It is the purpose of this article to discuss further one of the points suggested by Salmon, viz., the effect of season on the application of this method.

As shown by Salmon, the standard deviation depends upon the consistency or uniformity of the differences between the two items compared. Odds, therefore, pile up rapidly, even though the gain may be small, if there is no variation, or only slight variation, between the differences from year to year, while odds will be low if large variations occur.

In order to obtain illustrative material, an attempt was made to secure data covering a period of years showing the benefits derived from under drainage. It appears that the benefits from drainage

1Contribution from the Southern Division Staff, Soil Improvement Committee, National Fertilizer Association, Atlanta, Ga. Received for publication August 21, 1926.
2Agronomist.
3Reference by number is to "Literature Cited," p. 1067.