A COMPARATIVE STUDY OF STUDENT'S METHOD AND BESSEL'S FORMULA

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In a recent paper (1) reporting the data secured from applying ammonium sulfate to barley and wheat following sorghum, odds were calculated by two methods. These are summarized as follows:

"In all of these figures the differences in odds as derived from Bessel's formula and from Student's method are somewhat different than has generally been reported. There is an impression derived from the literature, though not actually stated in so many words, that Student's method should give better odds in most cases than Bessel's formula method. In these tests the writer believes that the arrangement of plots should make either method applicable. If anything, Bessel's formula is in most cases theoretically at a disadvantage, but of the 54 different pairs of odds calculated by the two methods Bessel's formula gives the better odds (sometimes by far) in 44 cases."

Though other cases have been reported by Love (7 p. 222), Kemp (6), and Hayes (4), the stress in the literature has seemed to be in the opposite direction. This has resulted in a feeling, at least among some experimenters, that one is always on the safe side if Bessel's formula is used. The data referred to above do not bear this out. It seems desirable to find out as many factors as are operative in causing different odds to be secured and to evaluate the effect of each. The study has brought out other possibilities and methods which are also included.

In a comparison of odds for the same data secured on the one hand by Bessel's formula from the table of Pearl and Miner (12) and on the other hand from Student's tables (18), there are three factors which cause different odds, viz., the method of computing odds; the handling of correlation; and the difference in the functions, especially for small numbers.

METHOD OF COMPUTING ODDS

Statisticians are undoubtedly well aware that the odds in the tables of Pearl and Miner (12) are derived from a different basis than those of Student (18). Many experimenters, among whom was the writer (1), do not realize this. The difference can be shown by the following example.

1Contribution from the Division of Agronomy, University of California, Davis, Calif. Received for publication June 2, 1930.
2Assistant Agronomist.
3Reference by number is to "Literature Cited," p. 961.