ANALYSIS OF DATA FROM A NATURAL ENZOOTIC OF TRICHOSTRONGLYDOSIS II HAEMATOCRIT COUNTS[1]

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Introduction

BU-109-M consisted of a study of the variability in weight data, and now a study to determine and examine the various sources of variation in haematocrit data from sheep infected with trichastrongylidosis will be undertaken. The various sources of variation will be discussed and an attempt will be made to ascertain the significance of these results.

A discussion of the data and its presentation in the form of tables and graphs will also be given here.

Explanation of Tables and Graphs

Tables IA to XIIIA consist of the raw haematocrit data in percent. Each table contains the data from all lambs sired by the particular ram indicated at the top of the table. Determinations were taken on the dates indicated with the date of the first determination varying over some lambs. The remaining dates, after the first, are the same for all lambs.

The number in parentheses after particular lamb numbers indicates that the lamb is a member of that particular twin pair. The letters "t.s." indicate that the lamb is a twin single, i.e., that the other member of the twin pair has died.

The observations in parentheses in the body of the table are missing plot values estimated by the iterative procedure given by Snedecor.[2]

Since it is necessary to preserve the animals, when the haematocrit reached a value of 15 percent the animal was treated. Experience has shown that if the haematocrit level is allowed to fall below this figure mortality is very high.

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[2] Snedecor, G. W. (1956). Statistical Methods, 5th Edition, The Iowa State College Press, Ames, Iowa

This accounts for the higher readings on the later dates for the treated lambs. These values should be deleted in final analyses.

Tables IB to XIIIB give the analyses of variance for the data in tables IA to XIIIA. A randomized complete block analysis with orthogonal partitioning of the sums of squares for dates, lambs and dates x lambs interaction was applied to each set of data.

For the calculation of these orthogonal comparisons the dates were coded in the following manner. The date of the first observation was given a value of one, and the succeeding dates were coded as to the number of days from the initial observation. Thus because of the varying dates of the initial observation the coded dates, and hence the means and deviations from the means, varied also.

The formulas for the calculation of the linear component of the sum of squares for dates and of the various component sums of squares of the dates x lambs interaction sum of squares were given in BU-109-M.

Table XIV summarizes the mean squares, given in tables IB to XIIIB, for the important sources of variation for each ram.

The coefficients of variation for each ram along with the square roots of the residual mean squares and over-all means are given in table XV.

In figure I the haematocrit totals over all lambs are plotted against dates for four rams.

Discussion

From tables IB to XIIIB and table XIV it can be seen that the linear component of the dates sums of squares accounts for a significant part of the variation among dates; the amount of variation accounted for is not as great in comparison as this same component in the weight data, the average mean square for dates linear being only about ten times as great as that of deviations from dates linear while it was 200 times as great in the weight data case.

Figure I and table XIV indicate that the trend is not generally linear and that quadratic and higher components or some other function of the data could be taken out with beneficial results. This was not done at the present stage of this study since transformation of the original data may be necessary.