Reference : AB/P/Tech/C1/19

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PREDICTION OF THE INCIDENCE OF TRYPANOSOMIASIS IN CATTLE FROM THE INCIDENCE IN ANY ONE MONTH.

Records of the incidence of trypanosomiasis in Rhodesian cattle are readily available, dating back to 1952. The total cases fluctuate from year to year, and, over an eleven year period, a seasonal fluctuation is evident, with a peak during the early dry season, March, April and May, fig. 1.

Since both the monthly totals and the annual totals fluctuate there seemed a possibility that the variation in one month might be so closely related to the variation in the total for that month and the following 11 months (called here "the following year") as to provide a method of predicting the probable incidence of trypanosomiasis.

Records were compiled of the monthly incidence of trypanosomiasis in Urungwe and in Sebungwe cattle from 1964 - 1974 and a series of correlations computed between the total cases for one month and for the following year, e.g. 10 January totals and 10 totals for the periods January to December from 1964 to 1974. The correlation coefficients are given in Table 1.

In some months, notably June and August the mean number of trypanosomiasis cases in Sebungwe cattle were found to be closely correlated with the total cases for the following year. A similar situation was evident for October and December for cases in Urungwe cattle. The high values r = 0.868, 0.892; and 0.878, 0.866 respectively suggested that fitting regression lines would be informative.

Linear regressions were plotted for August totals against those of the following year ($y = 1276.67 + 8.734x$) for Sebungwe cattle, and for October totals and those of the following year for Urungwe cattle ($y = 33.265x - 41.5$). When confidence limits were fitted, however, the range was so large as to make the prediction almost valueless. For example, in August 1974 the total of cases for Sebungwe and Urungwe cattle together was 95, which with a correlation coefficient r = 0.88 gave a regression equation of $y = 605.7 + 13.198x$, from which the expected total for the following year would be 1 860, but the 95% confidence limits are $\pm$ 1 772, so that, at that level of probability, one would expect there to be between 88 and 3 632 cases. At the 99% confidence limit the expectation would be between 0 and 4 467, which anyone who has had experience of cattle trypanosomiasis in Rhodesia could predict anyway!

These results were presented to a member of the department of Biometrics who showed sufficient interest in the idea of prediction to programme the data for computer analysis using the raw totals, logarithms of the totals for the following year, for six month periods and for other months than June, August, October and December giving confidence limits for each. The result was the same, that the range of values was too wide to be of use in predicting the incidence for the following year.

The most that can be said from these data is that when cases of trypanosomiasis in cattle are high in the months showing a high correlation coefficient the total incidence for the following year is likely to be high, and vice versa.

This exercise has been carried out to forestall further attempts to spend time on analysis of past trypanosomiasis records as a means of predicting future incidence.

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TABLE 1. CORRELATION COEFFICIENTS FOR PREDICTION OF TRYPANOSOMIASIS CASES IN CATTLE

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SEBUNGWE	0.593	0.661*	0.581	0.828**	0.744**	0.868***	0.788**	0.892***	0.778**	0.793**	0.767**	0.799**
URUNGWE	0.704*	0.797**	0.666*	0.631*	0.672*	0.086	0.477	0.412	0.819**	0.878***	0.844**	0.866***

* = p 0.05
** = p 0.01
*** = p 0.001

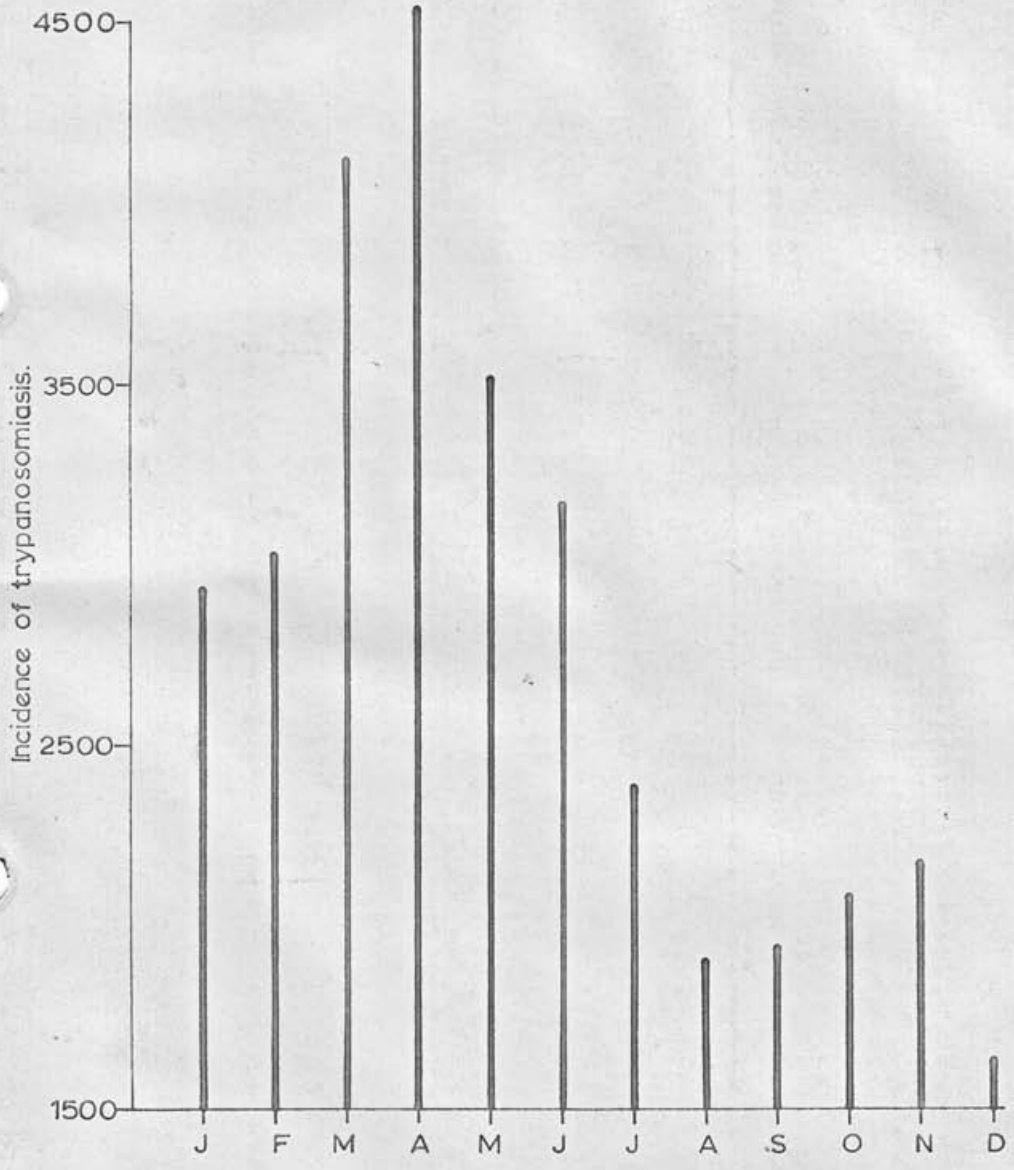

Fig. 1 Trypanosomiasis cases in Sebungwe and Urungwe cattle 1964 - 1974.