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9. ABSTRACT

This note presents the methodology and results of a study of the effects of foot and mouth disease on a pig farm in the Cauca Valley of Colombia in 1973. This case study concerns one of 14 pig farms from which data were collected. The virus types of the disease were A and O. At the time of the outbreak the herd consisted of 104 breeding sows in a single building holding a total of 922 pigs. Ninety-eight percent of the herd became infected. Considering both direct and consequential effects, the economic loss was calculated at U.S. \$37,200. This is equivalent to 44 percent of the expected net income over the two-year period in which the disease has exerted and will continue to exert an economic effect.

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ECONOMIC LOSSES FROM FOOT AND MOUTH DISEASE: A CASE STUDY ON A PIG FARM IN COLOMBIA

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SUMMARY

An epidemic of foot and mouth disease which occurred in the Cauca Valley of Colombia in 1973 provided an opportunity to study economic losses generated by this outbreak on commercial pig farms. This case study concerns the first of 14 pig farms from which data were collected.

At the time of the outbreak the herd consisted of 104 breeding sows in a single building holding a total of 922 pigs. Ninety-eight per cent of the herd became infected.

Considering both direct and consequential effects, the economic loss was calculated at US\$37,200. This is equivalent to 44 per cent of the expected net income over the 2-year period in which the disease has exerted and will continue to exert an economic effect.

INTRODUCTION

Despite the very large sums of money spent on foot and mouth disease control, data concerning physical losses at farm level in developing countries are rare, especially in the case of swine. Analysis of economic losses is even rarer (Peterson, 1968). Most data on physical losses have been recorded in countries where the disease has occurred in sporadic epidemics, such as England (Power and Harris, 1973).

An extensive epidemic of foot and mouth disease occurred in 1973 in the Cauca Valley, Colombia, in the neighbourhood of this Centre. Virus types were O and A. We used this opportunity to initiate a study of the economics of the disease on pig farms and data are being collected from a total of 14 premises. Data from the first farm visited were collected and analysed as a preliminary case study. This note presents the methodology and results.

All the pigs on the farm were housed in a single building which had defects of construction which facilitated the spread of the virus between groups of animals. At the time of the outbreak the herd consisted of 104 breeding sows in a total of 922 pigs of all ages. Ninety-eight per cent of the herd became clinically infected. The virus type concerned was A₂₇ (Foot and Mouth Diagnostic Centre, Colombian Institute for Agriculture).

METHODS

Data were collected relating to the situation before, during and after the outbreak. The headings used were:

- Total number of live animals by age and sex
- Deaths by age and sex
- Fertility
- Abortions
- Average number of pigs reared/sow/year
- Liveweight gains
- Age at slaughter
- Rate of adult replacement.

Assumptions were made concerning feed requirements and food conversion. A single set of unit costs for both food and the price of pigmeat was assumed for the whole period.

Pre-outbreak data were used to estimate the "normal" or steady state herd size and composition on this farm, and a related table of sales and expenditures over time. The time interval used for the analysis was 2 months. The outbreak inflicted a change in the herd size and structure, delaying the stream of sales and expenditures over time until the "steady state" herd was achieved once again 14 months after the beginning of the outbreak.

The economic loss was measured as the difference between the Net Present Value of the farm with and without the disease. Net Present Value is defined as the flow, measured in bimonthly intervals, of future net incomes discounted back to the present at a given rate. A 12 per cent annual discount rate was used. Net Present Value criteria has previously been applied to economic analysis of animal health (Ellis, 1972).

RESULTS

Pre-outbreak mortality on the farm calculated bimonthly for a period of 12 months averaged 6 per cent, this level increased by 24.7 per cent during the first 2 months when clinical disease was present. This increased mortality was measured as the additional pigs which died on the farm during these 2 months in relation to the pig inventory at the end of the month preceding the outbreak. Losses were highest in unweaned piglets (47 per cent versus 15 per cent pre-outbreak) followed by losses in store pigs (32 per cent versus 3 per cent) and in fatteners (23 per cent versus 3 per cent). Mortality in breeding sows was also significantly increased (17.8 per cent versus 0.5 per cent).

The growth of surviving store pigs was retarded for 2 months. No sows farrowed on the fifth and sixth month following the outbreak as they could not be serviced during the active stage of the disease. An increased number of sows had to be selected from the growing stock as replacement breeding animals.

Table 1 shows the dramatic reduction in net income as a result of the outbreak of foot and mouth disease, particularly in the first year. In monetary terms the total economic loss was calculated as US\$37,200, equivalent to 44 per cent of the expected net income over the 2-year period in which the effect of the disease has been and will be felt.

DISCUSSION

Clearly, the reduction of gross sales in the 2-year period from the beginning of the outbreak is explained by: an increased mortality rate, lower weight gains for growing pigs, an increased abortion rate and a lower birth rate.

TABLE I
Reduction in expected net income for a swine herd following an outbreak of foot and mouth disease (FMD)

	First year (%)	Second year (%)
Decrease in value of sales	43.5	17.4
Decrease in feed expenditures	37.7	0
Net income* with FMD as % of expected net income without FMD	48.5	63.5

* Income net of all direct costs. It was assumed that feed costs represent 75 per cent of all direct costs.

Feed costs constituted a large portion of total expenditures. These costs were lowered by the reduced requirements of sick pigs (only half that of "normal") and the reduced herd size (Table I).

Mortality on this farm during the active stage of the outbreak was the third largest among the 14 farms being studied. This fact explains why economic loss for this farm is probably larger than that of most of the remaining farms in the total sample.

The total study of the 14 farms will later be presented in a publication with both the analytical model developed for it and the requirements for this type of economic analysis.

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PERTES ÉCONOMIQUES DUES À LA FIÈVRE APHTEUSE: CAS D'UNE PORCHERIE EN COLOMBIE

Résumé—Une épidémie de fièvre aphteuse apparue en Colombie, en 1973, dans le Cauca Valley a donné la possibilité d'étudier les pertes économiques en résultant sur des élevages industriels de porcs.

Cette étude concerne la première des quatorze fermes intéressées par ces observations.

Au moment de l'apparition de la maladie, le cheptel était constitué par cent quatre truies nourricières entretenues dans un unique bâtiment abritant un total de neuf cent vingt deux porcs—98 p. 100 de cet effectif ont été contaminés.

En prenant en compte les dommages directs et indirects constatés, la perte a été évaluée à 37 200 dollars US, somme qui représente l'équivalent de 44 p. 100 du revenu net escompté pour la période de deux ans durant laquelle la maladie a eu et a continué à avoir des incidences économiques.

PÉRDIDAS ECONÓMICAS POR FIEBRE AFTOSA: UN ESTUDIO DE CASO EN UNA GRANJA PORCINA EN COLOMBIA

Resumen—Una epidemia de Fiebre Aftosa que ocurrió en el Valle del Cauca, Colombia, en 1973, fué utilizada como oportunidad para estudiar la pérdida económica por esta causa en granjas porcinas comerciales.

Este estudio de caso se refiere a la primera de 14 granjas porcinas de las cuales se recogió información.

En la época del brote el hato consistía en 104 marranas de reproducción ubicadas en una sola edificación que cobijaba un total de 922 cerdos. Noventa y ocho por ciento del hato fué infectado.

Considerando los efectos directos e indirectos, la pérdida económica fué calculada en US\$37.200. Ello equivale a 44.0 por ciento del ingreso neto de dos años, período durante el cual la enfermedad ha ejercido y ejercerá un efecto económico.