

## SHORT COMMUNICATION

### PREVALENCE OF ANTIBODY TO ROTAVIRUS IN MOROCCAN CATTLE

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**Abstract**—A serological survey was carried out in order to determine the prevalence of anti-rotavirus antibodies in Moroccan cattle under different management conditions.

From the 493 serum samples examined, 325 (65.9%) were found positive, using a counter-immunoelectrophoresis technique.

Animals of indigenous breed coming from farms with rapid turnover or large number of animals, or having frequent contacts with imported cattle, had a higher rate of seropositivity; however, positive sera were also found in cattle from small farms in remote areas, showing that rotavirus infection is ubiquitous in that country.

No relationship was found between the prevalence of anti-rotavirus antibodies and the frequency of calf diarrhoea. The percentage of seropositive animals in a herd has to be considered as an epidemiological indicator.

**Key words:** Rotavirus, cattle, viral diarrhoea, epidemiology

### FRÉQUENCE DE L'INFECTION PAR ROTAVIRUS CHEZ LES BOVINS AU MAROC

**Résumé**—Une enquête sérologique a été réalisée en vue de déterminer la fréquence des anticorps anti-rotavirus chez les bovins marocains dans différentes conditions d'élevage.

Parmi les 493 échantillons de sérum examinés, 325, soit 65.9%, étaient positifs par une technique de contre-immuno-électro-osmophorèse.

Les bovins de race locale provenant de fermes où il y a un grand nombre d'animaux ou une rotation rapide de ceux-ci (achats et ventes fréquents), ou ayant souvent des contacts avec du bétail importé sont plus fréquemment séropositifs. Néanmoins, des sérums positifs sont également présents dans de petites fermes de régions isolées. L'infection à rotavirus est donc ubiquitaire dans ce pays.

Aucune corrélation n'a été observée entre le pourcentage d'animaux possédant des anticorps anti-rotavirus et la fréquence des problèmes de diarrhée chez les veaux dans les mêmes exploitations. Le pourcentage d'animaux séropositifs dans un troupeau constitue seulement un indicateur épidémiologique.

**Mots-clefs:** Rotavirus, bovin, diarrhées virales, épidémiologie

## INTRODUCTION

Since the first reports of Mebus and coworkers [1, 2], bovine rotavirus has been frequently implicated in the aetiology of neonatal calf diarrhoea [3-5].

The virus has a worldwide distribution, including North America, most European countries, Australia and New Zealand and some Asian countries [6]. For the African continent, bovine rotavirus infection has only been reported in South Africa [7].

The purpose of the present survey was to determine the prevalence of antibodies to rotavirus infection in Moroccan cattle under different management conditions, especially extensive management in isolated areas. Therefore, a counterimmunoelectroosmophoresis method was chosen because, although not quantitative, it is as specific and as sensitive as classical techniques such as indirect immunofluorescence or complement fixation test [8, 9] and it has the advantage of being rapid, inexpensive, very easy to perform and to allow the simultaneous screening of a large number of samples.

## MATERIAL AND METHODS

*Sera*

A total of 493 sera were tested for the presence of anti-rotavirus antibodies. The animals were distributed into seven groups: groups A, B, C, D, E: animals of indigenous breeds, some of them from extensive farms with few if any contact with imported cattle; group F: recently imported German Fleckvieh cattle; group G: sick animals examined by the Ambulatory Clinic or presented to the Institute's Veterinary Center; most of these patients were of Friesian breed. Table 1 gives the characteristics of each group.

*Counterimmunoelectroosmophoresis*

The sera were tested for the presence of anti-rotavirus antibodies using the counter-immunoelectroosmophoresis technique described by Middleton and coworkers [8] and used in our laboratory [10]. Briefly, glass slabs (120 × 90 mm) were covered with 16 ml of 0.025 M Tris-barbital buffer (pH 8.6) containing 1% agarose. Two parallel rows of wells (4 mm diameter) were punched about 10 mm apart. Anodal wells were filled with 15  $\mu$ l of serum samples and cathodal wells with 15  $\mu$ l of bovine rotavirus antigen. Electrophoresis was performed in 0.05 M Tris-barbital buffer (pH 8.6). A constant current of 150 V, 120 mA was applied for 90 min at 10°C. The slabs were washed overnight in 0.85% NaCl, treated for 20 min with 1% tannic acid in order to precipitate the antigen-antibody complex and rinsed briefly in distilled water before reading.

Bovine rotavirus antigen (strain S14) was produced in cell culture and purified by isopycnic centrifugation in cesium chloride [11]. Reference anti-rotavirus antiserum was prepared by hyperimmunization of rabbits, using the same purified rotavirus antigen. Its specificity was controlled using known samples containing or not containing bovine rotavirus.

## RESULTS

The results are given in Table 1. From the 493 sera tested, 325 (65.9%) possessed anti-rotavirus antibodies. These antibodies were detected in each group of animals. In healthy native Moroccan cattle, the prevalence of antibody was significantly higher

Table 1. Percentage of animals with antibody to rotavirus in the different groups of cattle

Group	Breed	Management conditions	Contact with imported cattle	Mean herd size	Livestock turnover	Diarrhoea in calves	Number of samples tested	Number of positive sera	Percentage of seropositive animals
A	Brown Atlas	Intensive	Frequent	500	Low	Frequent	107	67	62.6%
B	Brown Atlas	Feedlots (fattening steers)	Rare	50	Moderate	NA	46	19	41.3%
C	Blonde Oulmes Zaer	Extensive	Rare	700	Low	Very rare	43	28	65.1%
D	Blonde Oulmes Zaer	Extensive	None	30	Moderate	Very rare	21	8	38.1%
E	Brown Atlas	Extensive	Relatively frequent	20	High	Rare	27	17	63.0%
F	German Fleckvieh	Intensive	Imported	200	Low	Unfrequent	38	19	50.0%
G	Various, mainly Friesian	Mainly semi-intensive	Very frequent	≈30	Very high	Very frequent	211	167	79.4%

\* NA = not applicable.

( $P < 0.01$ ) in groups A, C and E than in groups B and D. Positivity rate in recently imported animals (group F) was intermediate. Sick animals (group G) had a very high percentage of seropositivity.

## DISCUSSION

Neonatal calf diarrhoea is very common in Morocco, where it is the main cause of calf mortality [12]. From the present results, it appears that rotavirus infection is widespread in that country, thus certainly plays a role in the aetiology of calf diarrhoea.

As for other viruses recently identified in Morocco [13], the question arises whether rotavirus infection has been mainly introduced by imported European cattle. Anti-rotavirus antibodies were found in animals having rare if any contact with imported cattle. This would suggest that rotavirus infection probably pre-existed in animals of indigenous breeds, confirming the ubiquitous nature of the infection.

Groups with high antibody prevalence ( $\approx 65\%$ : A, C, E) are characterized by a high livestock turnover (E) or a large number of animals per farm (A, C) and often by close contacts with imported cattle (A, E); groups with low antibody prevalence ( $\approx 40\%$ : B, D) are reared in small farms and have limited contacts with imported breeds.

The incidence of rotavirus infection in recently imported cattle (group F) probably reflects the situation in their country of origin. Group G is composed of sick animals, mainly of Friesian breed, among which are calves suffering from diarrhoea. In such conditions, the excretion of large amounts of rotavirus by some of these diarrhoeic calves acts as a source of repeated contamination and may explain the high frequency of seropositivity in that group (79%).

In conclusion, the percentage of animals with anti-rotavirus antibodies in a herd seems to depend from breeding conditions, but is not directly related to the occurrence of diarrhoea in young calves, the appearance of which depends also from many other factors such as environmental and nutritional conditions. Asymptomatic rotavirus excretion has already been observed in calves from a selection station in Belgium [14].

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